MARYLAND

Agricultural Experiment Station.

BULLLTIN NO. 45.

SPECIAL ISSUE.

COMPOSITION OF

COMMERCIAL FERTILIZERS

SOLD IN THIS STATE.

COLLEGE PARK, MD.

FEBRUARY, 1897.

MARYLAND

Agricultural Experiment Station.

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Located on the B. & O. R. R., 8 miles N. of Washington, D. C.

NOTICE.

NOTE: Under the laws of Maryland, the inspection, sampling and analysis of commercial fertilizers is to be done under the auspices of the Maryland Agricultural College, by the Professor of Chemistry of the College, who is ex-officio State Chemist. The results of these examinations, being agricultural information of value and general interest, will be published, from time to time, as Special Bulletins, from the Maryland Agricultural Experiment Station.

These Bulletins will be mailed, free, to any farmer who asks for them.

ADDRESS,

MARYLAND AGRICULTURAL EXPERIMENT STATION,

COLLEGE PARK, MD.

INSPECTION AND ANALYSIS OF

COMMERCIAL FERTILIZERS SOLD IN MARYLAND.

BY THE CHEMICAL DEPARTMENT OF THE

MARYLAND AGRICULTURAL COLLEGE.

DR. H. B. MCDONNELL, *State Chemist.*

*H. C. SHERMAN, M. S., *Assistant Chemist.*

F. P. VEITCH, B. S., *Assistant Chemist.*

F. B. BOMBERGER, B. S., *Assistant Chemist.*

W. W. SKINNER, B. S., *Assistant Chemist.*

J. R. LAUGHLIN, B. S., *Assistant Chemist.*

The following table gives, side by side, the analysis of the various fertilizers as made in the laboratory and the guaranteed analysis as stamped on the bags. The figures indicate per cent, or parts in a hundred, except the columns headed "No.," which contains the respective numbers by which the samples are known in the laboratory, and the last two columns, which contain respectively the "comparative value found" by analysis and the "comparative value guaranteed," the former is calculated from the "analysis found," the latter is calculated from the "analysis guaranteed" as stamped on the bags; in each case using the following schedule of values for the various ingredients:

In Mixed Fertilizer:	
For Nitrogen, calculated as Ammonia	15 cts. per pound.
" Potash (K_2O), in forms free from muriate	6 " " "
" Potash (K_2O), as muriate	5 " " "
" Available Phosphoric Acid	6 " " "
" Insoluble Phosphoric Acid	3 " " "
" " " " when from S. C. Rock	2 " " "
In Dissolved S. C. Rock:	
Available Phosphoric Acid	5 " " "
In Ground Bone:	
For Nitrogen Calculated as Ammonia, in "Fine" Bone	14 " " "
" Nitrogen, Calculated as Ammonia in "Fine Medium" Bone	12 " " "
" Nitrogen, Calculated as Ammonia, in "Medium" Bone	10 " " "
" Nitrogen, Calculated as Ammonia, in "Coarse" Bone	8 " " "
" Phosphoric Acid in "Fine" Bone	5 " " "
" " " " " "Fine-Medium" Bone	4 " " "
" " " " " "Medium" "	3 " " "
" " " " " "Coarse" "	2 " " "
In Tankage:	
For Nitrogen, calculated as Ammonia	12 " " "
" Phosphoric Acid	4 " " "
In Nitrate of Soda:	
For Nitrogen, calculated as Ammonia	12 " " "

The Mechanical Analysis of ground bone is made by using sieves with circular holes as follows:

Less than 1-50 inch, "Fine."
Less than 1-25 inch, "Fine-Medium."
Less than 1-12 inch, "Medium."
Over 1-12 inch, "Coarse."

*Leave of absence for one year from July 1, 1896.

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3078	Alexandria Fert. & Chem. Co., Alexandria, Va.	Ammoniated Dissolved Bone.	Hancock.
3079	" " "	Dissolved S. C. Bone	Hancock.
3337	John H. Armstrong & Co., North East, Md.,	Pure Raw Bone	North East.
3324	Baltimore Guano Co., Baltimore, Md.	B. G. Ammoniated Bone Phosphate.	Hampstead
8367	" " "	Baltimore Special Wheat and Grass Mixture.	Baltimore
3365	" " "	Farmers' Alkaline Bone	Baltimore
3366	" " "	Farmers' Dissolved Bone	Baltimore
3036	Baugh & Sons Co., Baltimore, Md.	Animal Bone and Potash Compound.	Taneytown
3071	" " "	Animal Bone and Muriate of Potash Mixture.	Cumberland
3331	" " "	Bone Meal	Washington Grove.
2947	" " "	Bone Meal Warranted Pure.	Baltimore
3028	" " "	Crop Grower	Monrovia
3027	" " "	Day's Ammoniated Bone Phosphate.	Monrovia
2999	" " "	Domestic Dissolved Bone	Baltimore
2971	" " "	Double Eagle Phosphate	Baltimore
2975	" " "	Export with Potash	Baltimore
2958	" " "	General Crop Grower	Baltimore
2949	" " "	H. G. Acid Phoshpate or Dissolved S. C. Rock.	Baltimore
2960	" " "	Old Standby Raw Bone Super Phosphate.	Baltimore
3070	" " "	Potato Fertilizer.	Cumberland

Maryland Agricultural College, September, 1896, to January, 1897.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3078	2.10	1¾	1.63	2	1 45	9.50	8	10.95	.....	$20.20	$16.85
3079	....	.....	....	.....	1.35	13.53	14	14.88	.....	13.53	14.00
3337	4.23	4	....	.....	.....	.....	.....	25.42	23	27.84	.....
3324	1.93	1½	2.16	2	1.53	8.71	8	10.24	10	19.32	17.30
3367	1.41	1	2.13	2	1 49	9.54	9	11.03	11	18.70	17.00
3365	.....	... ..	2.06	2	1 51	10.08	10	11.59	12	12.75	12.80
3366	.....	.....	....	.....	1.29	13.62	14	14.91	15	13.62	14.00
3036	2.36	2	2.59	2	2.46	10.33	8	12.79	10½	23.55	19.10
3071	4.26	.....	4.38	.....	9.12	10.35	.....	19.47	.....	35.05	.....
3331	4.91	4	.....	.....	.....	.....	.....	23.07	21½	30.25	.....
2947	5.52	4	.....	.....	....	....	.....	22.61	21½	30.61	.....
3028	1.55	1	2.13	1	1.67	8.01	8	9.68	.....	17.39	13.60
3027	2.23	2	2.10	2	2.17	8.46	8	10.63	.....	20.24	17.60
2999	2.76	2	....	.....	5 64	10.06	10	15.70	.....	23.73	18.00
2971	3.13	2½	.80	½	2.75	9.56	8	12.31	10½	23.31	19.10
2975	3.12	2	2.39	3	7.02	6.68	.....	13.70	11	23.98	22.20
2958	1.55	1	1.29	1	1.81	8.86	8	10.67	.....	17.64	13.60
2949	.....	.....	.....	....	1.70	14.76	14	16.46	15	14.76	14.00
2960	2.45	2	1.01	1	2 75	9.53	8	12.28	10½	21.45	18.10
3070	2.29	2	1.85	2	2.26	9.61	8	11.87	10	21.61	18.80

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3069	Baugh & Sons Co., Baltimore, Md.	High Grade Potato Guano.	Cumberland
2939	" " "	Pure Dissolved Animal Bone.	Baltimore
3338	" " "	Raw Bone Super Phosphate.	North East
3374	" " "	Soluble Alkaline Super Phosphate.	Secretary
3349	" " "	Tomato Compound	Lapidum
3081	" " "	Wheat Fertilizer for Wheat and Grass.	Keedysville
3379	Beck, Walker & Brown. Chestertown, Md.	Propagator Super Phosphate.	Westover
3630	" " "	Trustworthy Super Phosphate.	Chestertown
3045	Wm. Bender, Millers, Md.	Raw Bone	Hampstead
3344	Berg Company, Philadelphia, Pa.	Electrical Raw Bone Fine	Elkton
3343	" " "	Electrical Special $25 Bone Manure.	Elkton
3375	J. B. Beverly & Bro., Winchester, Va.	Beverley Mixture	Pocomoke
2977	A. D. Birely & Sons, Ladiesburg, Md.	Ammoniated Bone Phosphate.	Baltimore
2978	" " "	Dissolved Bone	Baltimore
3281	D. Blocker & Co., Baltimore, Md.	Dissolved Bone Phosphate S. C.	Hagerstown
3282	" " "	No. 1 Dissolved Bone	Hagerstown
3068	C. E. Bond, Spencerville, Md.	Dissolved S. C. Rock	Spencerville
3067	" " "	Ground Bone	Spencerville
3353	Brumfield & Foster, Colora, Md.	B. & F. Ammoniated Bone Phosphate	Colora
3352	" " "	B. & F. High Grade Acid Phosphate.	Colora
2968	I. Bullock & Son, Baltimore, Md.	Dissolved Pure Raw Bone	Baltimore

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3069	5.25	5	6.32	7	1.95	7.80	6	9.75	.....	$32.60	$29.20
2939	3.98	3	...	.....	2.78	15.60	11	18.38	16	32.33	24.20
3338	2.38	2	1.23	1	1.89	9.61	8	11.50	10½	20.97	18.10
3374	.....	...	2.60	2	1.55	10.64	10	12.19	.....	13.86	12.00
3349	2.45	2	2.09	2	2.61	9.54	8	12.15	.....	22.46	17.60
3081	2.56	2	2.78	2	2.36	9.63	8	11.99	11	23.44	19.40
3379	1.18	1	2.62	2	1.45	10.31	10	11.76	.....	19.40	17.00
3630	2.03	1½	2.29	2	1.86	10.55	10	12.41	.....	22.15	18.50
3045	5.00	5.13	.....	.....	6.95	9.50	8.30	16.45	16 27	30.57	30.13
3344	4.86	4	....	.....	.....	.....	.....	23.72	20	27.46	.....
3343	2.93	2.	2.11	2	4.43	7.93	7	12.35	9	23.07	17.60
3375	2.79	2	1.91	1	6.27	6.61	6	13.96	14	21.97	14.20
2977	1.09	½	1.48	1	4.25	9.66	8	13.91	10	18.89	13.30
2978	2.09	2	....	.....	2.76	11.99	10	14.75	14	22.32	20.40
3281	.....	.....	.....	.....	1.31	17.60	14	18.91	.....	17.60	14.00
3282	1.72	1	.....	.....	2.54	10.39	10	12.93	12	19.15	16.20
3068	.....	.....	.....	.....	2.98	14.29	.....	17.27	.....	14.29	.....
3067	5.25	.. ....	.....	.....	.....	...	.....	21.18	.....	25.74	.....
3353	2.29	2	2.34	2	1.22	9.91	9	11.13	10	21.83	19.40
3352	.....	.....	....	.....	2.42	14.09	14	16.51	.....	14.09	14.00
2968	3.39	3.67	....	.....	3.09	12.30	12.30	15.39	.....	26.78	25.77

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3006	J. Bullock & Son, Baltimore, Md.	Pure Ground Raw Bone.	Baltimore
3319	Chemical Co. of Canton, Baltimore, Md.	Baker's Dissolved Bone Phosphate.	Alesia
3295	" " "	Baker's Standard Ground Bone.	Union Bridge
3363	" " "	Baker's H. G. Standard Guano.	Bel Air
3294	" " "	Bone and Potash.	Union Bridge
3312	" " "	Dissolved Ammoniated Bone.	Westminster
3313	" " "	Gem Phosphate	Westminster
3311	" " "	Harrow Brand Wheat Grower.	Westminster
3292	" " "	Pure Dissolved Animal Bone.	Union Bridge
3040	" " "	Pure Dissolved S. C. Bone	Gaithersburg
3310	" " "	Red Clover	Westminster
3029	" " "	Special Wheat and Grass Mixture.	Monrovia
3318	" " "	Truckers Delight	Alesia
3632	Chesapeake Guano Co., for J. M. Smith. Balto. Md.	Ammoniated Bone	Westminister
3351	R. L. Christie & Co., Colora, Md.	Farmers' Famous Bone Phosphate.	Colora
3350	" " "	Special for Wheat and Grass.	Colora
3357	E. A. Clendenin & Bro., Colora, Md.	Farmers' Favorite Vegetator.	Colora
3354	" " "	H. G. Acid Phosphate	Colora
3336	" " "	National Standard Ammoniated Phosphate.	Aberdeen
3355	" " "	Pure Dissolved Bone	Colora
3341	" " "	Soluble Bone Phosphate.	Elkton

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3006	5.77	4.92	.....	.....	.....	.....	.....	19.76	25.20	$27.50	$.....
3319	.60	¼	.....	.....	1.78	13.43	13	15.21	15.	18.99	17.55
3295	4.80	4	.....	.....	.....	.....	.....	23.75	20	32.52	.....
3363	2.66	2½	2.53	2½	1.40	9.01	9	10.41	10	22.16	21.40
3294	.....	.....	2.10	2	1.79	10.07	10	11.86	12	12.89	12.80
3312	2.57	2½	....	.....	3.37	10.74	9	14.11	.....	22.62	18.30
3313	.....	.....	.....	.....	1.35	14.45	13	15.80	15	14.45	13.00
3311	.90	½	1.79	1.	1.90	10.25	10	12.15	12.	17.93	15.70
3292	2.61	2½	.....	.....	3.06	11.86	12	14.93	13½	23.90	22.80
3040	....	.....	....	....	1.06	14.65	14	15.71	.....	14.65	14.00
3310	1.38	1	2.40	2	1.66	6.29	5	7.95	6	15.09	11.60
3029	1.44	1	2.57	2	1.74	9.20	9	10.94	11	18.97	17.00
3318	5.80	6	3.70	4	2.88	7.16	8	10.04	.....	31.42	31.60
3632	1.07	1	1.58	1	1.29	10.73	8	12.02	.....	18.44	13 60
3351	1.27	1	2.07	2	2 83	10.52	8	13.35	10	20.20	15.80
3350	2.05	2	2.22	2	2.39	10.27	10	12.66	13	22.12	21.80
3357	1.42	1	1.61	1	1.03	8.24	8	9.27	.....	16.38	14 20
3354	.....	.....	.....	.....	1.46	14.04	14	15.50	.....	14.04	14.00
3336	1.52	1½	1.51	1½	2.99	12.88	10	15.87	.....	23.32	19.80
3355	2.38	2	.....	.....	1.16	13.50	14	14.66	15	24.04	23 40
3341	.....	.....	3.93	2	1 59	12.02	10	13.61	11	16.59	12.40

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling
3076	E. A. Clendenin & Co., Colora, Md.	T. & P. Super Phosphate	Hancock
3356	" " "	Wheat and Grass Special Compound.	Colora
3335	Henry Cope & Co., Lincoln University Pa.	Ammoniated Bone Phosphate.	Aberdeen
3359	Josiah Cope & Co., Lincoln University Pa.	Acidulated Phosphate	Rising Sun
3361	" " "	Ammoniated Bone Phosphate.	Rising Sun
3360	" " "	Pure Steamed Bone	Rising Sun
3368	F. P. Covey, Federalsburg, Md.	Standard Bone Phosphate.	Baltimore
3325	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.	Ammoniated Wheat and Corn Fertilizer.	Maple Grove
3323	" " "	High Grade Cereal Guano.	Hampstead
3303	" " "	Niagara Phosphate	Westminster
3327	" " "	New Rival Ammoniated Super Phosphate.	Maple Grove
3328	" " "	Potato Hop and Tobacco Phosphate.	Maple Grove
3326	" " "	Practical Ammoniated Super Phosphate.	Maple Grove
3625	A. Lee Cummins, Smyrna, Del.	Soluble Bone and Potash	Chestertown
2942	Wm. Davison & Co., Baltimore, Md.	"Bos" Ammoniated Super Phosphate	Baltimore
2959	" " "	Dissolved S. C. Bone	Baltimore
2950	" " "	High Grade Ammoniated Super Phosphate.	Baltimore
2943	" " "	"Pen Mar" Ammoniated Bone Phosphate.	Baltimore
3038	E. E. DeLashmutt, Frederick. Md.	Pure S. C. Bone	Barnesville
3580	" " "	Soluble Bone Mixture	Dickerson
3595	" " "	T. O. White's Mixture	Dickerson

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value Per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed		Found.	Guaranteed.	Found.	Guaranteed.		
3076	.....	.....	.....	.....	1.01	14.94	14	15.95	.....	$14.94	$14.00
3356	1.82	1¼	2.13	2	1.10	9.97	9	11.07	.....	20.21	16.55
3335	1.40	1	2.66	1½	1.42	8.00	8	9.42	10	17.31	15.30
3359	....	.....	.....	.....	2.22	14.49	13	16.71	.....	14.49	13.00
3361	1.23	1	2.49	3	1.55	10.52	10	12.07	12	19.73	19.20
3360	2.80	2	...	.....	...	.....	.....	26.45	24	26.91	.....
3368	2.37	1½	2.60	2	2.13	10.67	9	12.80	10	23.79	17.90
3325	2.69	2½	1.78	1.60	1.93	10.27	10	12.20	11	23.33	21.70
3323	1.43	1	2.02	2	2.05	9.69	8	11.74	9	19.17	15.20
3303	.....	.....	.....	.....	1.90	13.10	11½	15.00	12½	13.10	11.50
3337	1.80	1½	2.03	1	2.20	10.64	10	12.84	11	21.52	18.10
3328	2.77	2½	3.73	3¼	1.08	10.40	10	11.48	10	25.17	22.75
3326	1.62	1	1.40	1.08	4 27	8.39	8	12.66	9	18.89	14.28
3625	.....	.....	2.17	2	.89	10.84	10	11.73	.....	13.36	12.00
2942	2.78	2½	2.58	2½	4.02	10.06	8	14.08	11	25.40	21.40
2959	....	.....	.....	.....	2.67	13.91	13.	16.58	16	13.91	13.00
2950	3.33	2¾	2.37	2¾	2 26	13.68	10	15.94	13	29.78	24.80
2943	2.18	1 40	2.59	2½	3.86	8.86	8	12.72	10	22.08	17.50
3038	.....	.....	....	.....	2.66	13.49	14	16.15	.....	13 49	14 00
3580	.. .	¾	.. .	¾	1.90	14.52	10	16.42	.....	14.52	15.00
3595	....	.....	....	... .	2.56	14.32	....	16.88	.....	14.32	.....

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3378	L. E. P. Dennis & Son, Crisfield, Md.	Fish and Potash Mixture, No. 1.	Crisfield
3377	" " "	Fish and Potash Mixture, No. 2.	Crisfield
3376	" " "	Truck and Tomato Guano	Crisfield
3030	Detrick Fertilizer & Chemical Co., Baltimore, Md.	Ammoniated Bone Phosphate.	Monrovia
3372	" " "	Dissolved S. C. Bone	New Market
2954	" " "	Dissolved S. C. Bone	Baltimore
2974	" " "	Farmers' Friend	Baltimore
2973	" " "	Farmers' New Method	Baltimore
2940	" " "	Imperial Compound	Baltimore
3066	" " "	Mason's No. 4	Silver Spring
3014	" " "	Pure Fine Ground Animal Bone.	Baltimore
2955	" " "	Soluble Bone Phosphate and Potash Fertilizer.	Baltimore
3591	" " "	Soluble Bone and Potash Fertilizer.	New London
3048	" " "	Special Mixture	Laurel
3022	" " "	Vegetator Ammoniated Super Phosphate.	Mt. Airy
3013	" " "	Wheat Fertilizer	Baltimore
3402	L. F. Detrick Suc. to Wooldridge F. & C Co., Balto	Kangaroo Komplete Kompound.	Baltimore
2986	J. W. Dorsey, Ellicott City, Md.	Ammoniated Phosphate	Ellicott City
2990	" " "	Mixture "D"	Ellicott City
3058	Dudley & Carpenter, Baltimore, Md.	Dissolved S. C. Rock	Baltimore
2956	P. P. Dunan, Baltimore Md.	Ammoniated Alkaline Guano.	Baltimore

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3378	2.20	3½	3.94	3½	1.76	8.46	7.	10.22	.....	$21.75	$22.40
3377	2.66	2½	2.57	2½	2.86	6.11	7	8.97	.....	19.60	18.40
3376	3.09	3	3.33	3	2.72	6.44	6	9.16	.....	21.96	19.20
3030	1.79	1½	1.08	1	4.24	9.10	9	13.34	11	19.91	17.50
3372	.....	.....	....	.....	.90	14.69	14	15.59	15	14.69	14.00
2954	.....	.....	.....	.....	1.15	14.33	14	15.48	15	14.33	14.00
2974	1.28	1	1.24	1	2.65	8.95	8	11.60	10	17.41	14.80
2973	2.90	2½	.....	.....	3.20	9.08	8	12.28	9	21.52	17.70
2940	1.40	1	1.24	1	2.16	9.38	9	11.54	10½	18.00	15.70
3066	2.54	2½	1.19	1	2.45	9.00	9	11.45	.....	21.08	19.30
3014	4.74	4½	.....	.....	.....	...	...	22.31	20½	31.64	.....
2955	.. .	.....	2.30	2	1.50	10.78	10	12.28	12	13.68	12.80
3591	.....	.....	2.04	2	.52	15.00	10	15.52	12	17.25	12.80
3048	1.33	1	1.24	1	4.14	8.90	8	13.04	10	18.39	14.80
3022	2.65	2½	1.52	1½	4.53	10.22	10	14.75	12	24.45	22.20
3013	1.57	1½	.....	.....	1.75	10.13	10	11.88	12	17.92	16.95
3402	2.11	2	3.36	3	3.73	9.14	8	12.87	11½	22.90	20 70
2986	1.92	1½	1.91	1½	1.51	8.99	8	10.50	9½	19.37	16.50
2990	2.31	2.70	1.64	2	2.67	10.33	10	13.00	12	22.57	23.30
3058	.....	.....	.....	.....	.63	16.23	14	16.86	15	16.23	14.00
2956	2.40	2	2.28	1	3.02	9.50	8	12.52	.....	22.69	16 60

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3054	P. P. Dunan, Baltimore, Md.	Dissolved Bone Phosphate.	Monkton
3631	" " "	Dissolved Bone Phosphate.	Westminster
3035	T. H. Eckenrode, Taneytown, Md.	O. K. Phosphate	Taneytown
3398	T. W. Eliason, Chestertown, Md.	M. & P. Super Phosphate	Chestertown
3399	" " "	No. 1, Super Phosphate & Potash.	Chestertown
3383	Emory & Burgess, Centreville, Md.	Bone & Potash	Hillsboro
3393	" " "	Diamond Bone Phosphate	Centreville
3392	" " "	Special Formula	Centreville
3288	D. Englar Jr., Medford, Md.	No. 1, Bone Phosphate	Medford
3287	" " "	No. 3, Bone Phosphate	Medford
3290	Englar & Rinehart, Linwood, Md.	No. 1, Ammoniated Bone Phosphate.	Linwood
3289	" " "	No. 2, Ammoniated Bone Phosphate.	Linwood
3348	Eureka Fertilizer Co., Perryville, Md.	Alkaline Bone and Potash	Perryville
3347	" " "	Farmers' Favorite Bone Phosphate.	Perryville
3346	" " "	Grain and Grass Mixture.	Perryville
3345	" " "	P. & P. Super Phosphate.	Perryville
3283	Fairbanks Canning Co., Chicago, Ill.	Steamed Bone	Hagerstown
3371	Farmers' Fertilizer Co. Westminster, Md.	Dissolved S. C. Rock	Westminster
3299	" " "	No. 1, Bone Phosphate	Westminster
3298	" " "	No. 2, Bone Phosphate	Westminster
3296	" " "	No. 3, Bone Phosphate	Westminster

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3054	.....	.....	.....	.....	1.81	15.01	14	16.82	16	$15.01	$14.00
3631	.....	.....	.....	.....	3.89	13.24	14	17.13	16	13.24	14.00
3035	1.67	1	2.99	1	2.80	6.99	8	9.79	.....	18.07	13.60
3398	.....	.....	2.18	2	1.08	10.91	12	11.99	.....	13.52	14.00
3399	1.50	1	1.43	1	2.40	9.22	8	11.62	.....	18.43	13.60
3383	.....	.....	1.84	1½	1.79	10.81	12	12.60	13	13.37	13.90
3393	1.06	2	.....	.....	2.16	9.71	8	11.87	10	16.13	16.80
3392	.....	.....	2.34	3	1.41	10.45	10	11.86	11	13.36	13.40
3288	2.84	1½	2.10	1½	3.11	8.77	9½	11.88	.....	23.01	17.40
3287	1.89	1	2.22	2¾	1.54	9.95	5	11.49	.....	20.73	11.75
3290	2.34	2½	1.37	1.84	3.50	10.36	11.31	13.86	.....	22.92	22.41
3289	.85	1.80	2.38	1.83	2.35	9.97	11.99	12.52	.....	18.30	21.62
3348	.....	.....	1.66	2	2.26	12.93	11	15.19	12	15.49	13.40
3347	1.73	2	2.57	2	4.74	10.02	10	14.76	12	22.62	21.20
3346	1.67	1	2.91	2	5.10	10.50	9	15.60	10	23.58	16.40
3345	.....	.....	.....	.....	2.82	14.24	14	17.06	15	14.24	14.00
3283	3.38	2½	.....	.....	.....	.....	.....	28.14	23	32.57	.....
3371	.....	.....	.....	.....	1.98	14.07	14.	16.05	.....	14.07	14.00
3299	3.00	2½	2.02	2½	1.62	9.19	9	10.81	11	23.02	22.00
3298	2.37	2	2.34	2½	1.74	9.05	9	10.79	10	21.35	19.90
3296	1.73	1¾	2.94	2½	2.16	8.88	9	11.04	11	20.09	19.75

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3297	Farmers Fertilizer Co., Westminster, Md	XX Bone Phosphate	Westminster
3364	W. S. Farmer & Co., Baltimore, Md.	B. & P. Fertilizer	Baltimore
3019	" " "	Dissolved S. C. Bone	Woodbine
3334	" " "	Ground Bone	Aberdeen
3018	" " "	Harvest Queen Phosphate.	Woodbine
3010	" " "	Pure Bone Meal	Baltimore
3301	N. I. Gorsuch & Son, Westminster, Md.	No. 3 Bone XXXX	Westminster
3300	" " "	Westminster Dissolved Raw Bone Phosphate.	Westminster
3053	Griffith & Boyd, Baltimore, Md.	Ammoniated Bone Phosphate.	White Hall
2981	" " " "	Ammoniated Soluble Bone.	Canton
2992	" " " "	High Grade Acid Phosphate.	Ellicott City.
3049	" " " "	Peerless Fertilizer	White Hall
3050	" " " "	Pure Dissolved Animal Bone.	White Hall
3051	" " " "	Pure Fine Ground Bone Meal.	White Hall
3017	" " " "	Strictly Pure Raw Bone Meal.	Woodbine.
2991	" " " "	Valley Fertilizer	Ellicott City
2961	Griffith & Lytle, Baltimore, Md.	Standard Bone Phosphate.	Baltimore
2951	Griffith, Turner & Co., Baltimore, Md.	Ammoniated Butchers' Bone Phosphate.	Baltimore
3062	" " " "	Animal Bone Phosphate.	Baltimore
3315	" " " "	Animal Bone Phosphate.	Glyndon
3061	" " " "	Ground Bone	Baltimore

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3297	1.33	1	2.76	3½	1.53	9.01	9	10.54	10	$18.48	$17.90
3364	.....	.....	1.70	2½	1.52	11.98	10	13.50	11	14.29	12.90
3019	.....	.....	.....	.....	1.89	14.88	14	16.77	15½	14.88	14.00
3334	3.27	3	.....	.....	.....	.....	.....	18.56	15	20.63	.....
3018	1.77	1½	2.96	2½	1.13	10.25	10	11.38	11½	21.25	19.90
3010	4.93	4	.....	.....	.....	.....	.....	22.89	23	28.94	.....
3301	.60	¼	1.68	1½	1.90	8.64	8	10.54	9	14.99	12.45
3300	1.24	1.40	2.36	2¼	2.04	8.21	7	10.25	8	17.15	15.45
3053	2.00	2	1.75	1½	2.66	10.26	9	12.92	10	21.46	18.90
2981	1.57	1	1.63	1½	1.75	8.54	7	10.29	8	17.64	13.50
2992	.....	.....	.....	.....	2.25	13.29	14.	15.54	15	13.29	14.00
3049	.....	.....	2.01	2	1.97	8.47	8	10.44	9	11.28	12.20
3050	2.60	2½	.....	.....	2.72	9.68	10	12.40	11	21.05	20.10
3051	4.95	4	.....	.....	.....	.....	.....	23.92	22	30.84	.....
3017	4.81	4	.....	.....	.....	.....	.....	23.74	21½	29.89	.....
2991	.86	½	2.05	2	1.42	8.43	8	9.85	9	15.60	13.70
2961	2.08	2	1.07	1½	2.50	10.97	9	13.47	10	21.97	18.90
2951	1.79	1½	2.11	1½	2.12	9.25	9	11.37	10	19.85	17.40
3062	2.30	2½	2.19	1½	3.48	9.62	10	13.10	11	22.72	21.60
3315	2.23	2½	2.14	1½	3.42	9.54	10	12.96	11	22.33	21.60
3061	4.90	4	.....	.....	.....	.....	.....	24.08	20½	27.09	.....

Table of Analysis and Valuation of Fertilizers Made at the

No	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3316	Griffith, Turner & Co., Baltimore, Md.	High Grade Acid Phosphate.	Glyndon
3314	" " " "	Dissolved Animal Bone	Glyndon.
2985	" " " "	Soft Ground Bone	Baltimore
3317	" " " "	Soluble Bone Phosphate.	Glyndon
3304	E. O. Grimes, Westminster, Md.	Bone Phosphate	Westminster
3307	Hanover Bone Fert. Co., Limited, Hanover, Pa.	Blood and Bone Compound.	Westminster
3305	" " " "	Dissolved Bone Phosphate.	Westminster
3308	" " " "	Farmers' Crop Winner	Westminster
3309	" " " "	Hanover Excelsior Combine.	Westminster
3306	" " " "	Hanover Pure Bone Meal	Westminster
3063	S. M. Hess & Bro., Philadelphia, Pa.	Keystone Bone Phosphate.	Baltimore
2966	J. Horner, Jr., & Co., Baltimore, Md.	Ammoniated Raw Bone Superphosphate.	Baltimore
2967	" " " "	Dissolved Slaughter House Bone Dust.	Baltimore
2944	" " " "	Slaughter House Bone Dust.	Baltimore
3011	" " " "	The Cultivator	Baltimore
3340	Hubbard & Co., Baltimore, Md.	Buyers' Special Mixture	North East
2941	" " "	Columbia Gem Phosphate.	Baltimore
3008	" " "	Crescent Soluble Crop Producer.	Baltimore
3023	" " "	Dissolved Raw Bone	Mt. Airy
2970	" " "	H. G. Soluble S. C. Phosphate.	Baltimore
3339	" " "	IXL Superphosphate	North East

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3316	.....	.....	.....	.....	2.67	10.75	14	13.42	15	$10.75	$14.00
3314	2.72	2½	.....	.....	3.14	9.31	10	12.45	11	21.21	20.10
2985	4.53	4	.....	.....	6.23	8.55	.....	14.78	12	27.59	19.20
3317	.....	.....	1.51	1½	2.50	8.87	9	11.37	.....	11.38	10.50
3304	2.30	1	2.17	2	3.00	7.23	6	10.23	.....	19.55	12.20
3307	1.32	1	2.08	2	2.02	8.01	8	10.03	9	16.86	15.20
3305	.....	.....	2.03	2	1.12	8.11	8	9.23	9	10.59	10.40
3308	.91	½	1.65	1½	1.54	7.11	7	8.65	8	13.83	12.00
3309	2.62	2	3.44	3	1.66	9.36	9	11.02	10	23.53	20.40
3306	4.76	4	.....	.....	.....	.....	.....	20.14	23	29.32	.....
3063	1.31	1	1.15	1	1.47	11.88	9	13.35	11	20.22	16.00
2966	2.92	2½	3.04	2½	2.72	8.05	8	10.77	12	23.09	22.00
2967	2.72	2½	.....	.....	4.56	10.91	12	15.47	15	23.99	23.70
2944	6.60	6	.....	.....	.....	.....	.....	19.45	20	28.72	.....
3011	2.85	2½	1.82	2½	3.20	8.11	7	11.31	9	22.03	19.60
3340	3.46	.... ..	2.23	.....	2.42	7.62	.....	10.04	.....	23.21	.....
2941	.87	½	1.68	1½	1.98	8.44	8	10.42	10	15.61	13.80
3008	.79	.....	.....	.....	2.54	9.19	10	11.73	11	14.92	11.00
3023	3.05	2¾	.....	.....	4.50	10.46	11	14.96	13	24.40	21.15
2970	.....	.....	.....	.....	3.02	13.79	14	16.81	14	13.79	14.00
3339	2.50	2	1.81	1¾	1.55	8.20	7	9.75	8½	20.08	17.05

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
*3025	Hubbard & Co., Baltimore, Md.	Orientral Phosphate for Wheat or Grass.	Mt. Airy
2965	" " " "	Soluble Bone & Potash	Baltimore
3587	" " " "	Special Mixture	Mt. Airy
2976	" " " "	Standard Bone Superphosphate.	Baltimore
2994	" " " "	Wheat Growers Jewel	Baltimore
3060	M. P. Hubbard & Co., Baltimore, Md.	Ammoniated Bone & Potash Phosphate.	Baltimore
3322	" " " "	Celebrated Bone Superphosphate.	Fowblesburg
3016	" " " "	Farmers' Old Economy	Baltimore
2997	" " " "	Harvest King	Baltimore
2996	" " " "	H. G. Soluble S. C. Phosphate.	Baltimore
3321	" " " "	Soluble Bone & Potash	Fowblesburg
3628	T.R.Hubbard & Son, Chestertown, Md.	A. A. Bone Superphosphate.	Chestertown
3633	" " " "	Disolved S. C. Rock	Kennnedyville
3627	" " " "	Imperial Compound Phosphate.	Chestertown
3397	" " " "	Victor Phosphate	Centreville
3380	Randolph Humphreys, Salisbury, Md.	Our Mixture "B"	Salisbury
3381	" " " "	Our Fish Mixture "F"	Salisbury
3080	C. M. Keedy, Keedysville, Md.	Money Saving Phosphate	Keedysville
2979	Lazaretto Guano Co., Baltimore, Md.	Alkaline Phosphate	Canton
3044	" " " "	Ammoniated Bone Phosphate.	Woodsboro
3046	" " " "	Ammoniated (Bone ?) Phosphate.	Boyds

*ERRATA.—In Bulletin No. 40, August, 1896, "Ammonia guaranteed" in sample No. 2821, Hubbard & Co's. "Oriental Phosphate," should be 1½ per cent. instead of 2 per cent. and "comparative value guaranteed" should read $16.80 instead of $18.30.

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3025	1.47	1½	1.64	1½	1.78	8.81	8	10.59	10	$17.69	$16.80
2965	.....	.....	2.47	2	1.81	9.74	10	11.55	11½	12.93	12.60
3587	.....	.....	1.90	3	2.04	13.48	12	15.52	.....	16.20	15.00
2976	2.27	2	2.09	2	3.23	9.05	9	12.28	10	21.71	19.40
2994	1 84	1½	1.53	1½	1.90	10.01	10	11.91	11	20.20	18.60
3060	1.53	1	1.85	1½	1.62	8.36	8	9.98	9½	17.44	15.00
3322	1.91	2½	1.04	2	1.49	10.67	9	12.16	10½	20.46	21.20
3016	.98	½	1.50	1½	1.45	7.60	8	9.05	10	14.43	13.80
2997	1.62	1½	1.57	1½	1.37	10.63	9	12.00	10½	20.01	17.70
2996	.....	.....	.....	.....	1.14	14.65	14	15.79	.....	14.65	14.00
3321	.....	.....	2.50	2	.74	9.77	9	10.51	11	12.56	11.80
3628	1.99	1¼	3.33	3	2.21	10.58	9	12.79	.....	23.33	17.55
3633	.....	.....	.....	.....	2 05	14.74	14	16.79	.....	14.74	14.00
3627	1.61	1	3.83	2½	3.34	9.02	9	12.36	.....	21.48	17.50
3397	.....	.....	1.09	1½	4 29	10.51	7	14.80	.....	13.31	8 50
3380	3.63	3	1.92	1½	1.92	9.55	8	11.47	9	25.42	20.70
3381	2.68	2½	1.25	1	4.06	8.42	8	12.48	9	21.83	18.70
3080	1.11	1½	3.46	3	1.70	9.05	9	10.75	.....	18.67	18.30
2979	.....	.....	2.06	2	1.31	11.86	11	13.17	.....	14.44	13.00
3044	1.25	1	2.15	2	2.02	9.90	9	11.92	.....	18.99	15.80
3046	1.04	1	2.46	2	2.14	9.91	9	12.05	.....	18.75	15.80

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3047	Lazaretto Guano Co., Baltimore, Md.	Crop Grower	Boyds
2987	" " " "	Forcythe & Linthicum Mixture	Ellicott City
2989	" " " "	Harford Bone	Ellicott City
3043	" " " "	Pure Dissolved Animal Bone.	Hoods Mills
2980	" " " "	Pure Dissolved S.C. Bone.	Canton
2988	" " " "	Pure Ground Animal Bone.	Ellicott City
3286	A. A. Lechlider, Hagerstown, Md.	Eagle Bone Phosphate	Hagerstown
3285	" " "	S. C. Bone	Hagerstown
3284	" " "	Soluble Bone Phosphate	Hagerstown
3002	Lister Agrl. Chem. Works, Newark, N. J.	Ammoniated Dissolved Bone Phosphate.	Baltimore
3052	" " "	Animal Bone & Potash	White Hall
3007	" " "	Celebrated Ground Bone	Baltimore
2995	" " "	Celebrated Ground Bone Acidulated.	Baltimore
2983	" " "	Harvest Queen	Baltimore
2998	" " "	Pure Raw Bone Meal	Baltimore
2982	" " "	Standard Pure Bone Superphosphate.	Baltimore
3594	T. H. Longfellow, Greensboro, Md.	Special Mixture	Ridgely
3003	Md. Fertz. & Manfg. Co., Baltimore, Md.	Alkaline Bone	Baltimore
3005	" " " "	Dissolved S. C. Bone	Baltimore
3077	" " " "	Globe Complete Manure	Hancock
3039	" " " "	Linden Superphosphate	Germantown

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					Insoluble Found.	Available		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3047	1.82	2	2.33	2	2.00	10.09	10	12.09	.....	$21.10	$20.00
2987	2.49	2	3.66	2½	3.76	10.18	9	13.94	14	25.61	22.30
2989	3.39	3	.....	.....	11.73	7.59	.....	19.32	16	26.32	18.60
3043	2.90	2½	.....	.....	4.62	10.85	15	15.47	17	24.49	26.70
2980	.....	.....	.....	.....	1.96	14.04	14	15.94	.....	14.04	14.00
2988	5.07	4½	.....	.....	.....	.....	.....	22.37	21½	27.92	.....
3286	.70	1½	1.75	1	1.28	4.67	7	5.95	7	10.22	13.90
3285	.....	.....	1.88	1	1.38	3.74	6	5.12	6	6.17	7.00
3284	.72	1	1.24	1	1.75	4.50	6	6.25	6	9.85	11.20
3002	2.87	2.20	2.63	1½	2.05	10.55	9	12.60	11	25.13	20.10
3052	.....	.....	5.19	5	1.21	9.73	9	10.94	.....	15.40	14.00
3007	3.96	3	.....	.....	6.54	6.99	.....	13.53	11	24.19	15.60
2995	3.96	3¼	.....	.....	6.66	7.49	.....	14.15	12	24.87	16.95
2983	2.06	1½	3.20	2	1.99	10.48	9½	12.47	11½	23.15	16.10
2998	4.01	3¼	.....	.....	....	.....	.....	22.41	23	27.40	.....
2982	2.93	2.85	2.13	1½	2.51	10.69	10	13.20	12	25.26	23.25
3594	2.45	2	4.31	5	1.51	9.53	7	11.04	.....	24.00	19.40
3003	.....	.....	2.81	4½	1.25	13.07	11¾	14.32	12¾	16.38	16.65
3005	.....	.....	.....	.....	2.18	13.80	14	15.98	14½	13.80	14.00
3077	2.26	2	1.95	1½	3.17	8.01	9	11.18	10	20.24	18.90
3039	.....	.....	2.88	2½	2.55	11.04	11	13.59	12	14.94	13.90

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3004	Md. Fert. & Manfg. Co., Baltimore, Md.	Pure Dissolved Animal Bone.	Baltimore
2963	" " "	Pure Fine Ground Animal Bone.	Baltimore
3626	" " " "	Sangston's Cereal Plant Food.	Chestertown
3064	F. Maynard, Baltimore, Md.	Dissolved S. C. Bone	Baltimore
3065	" " "	Maynards Choice	Baltimore
2984	Md. Grange Agency, Baltimore, Md.	Dissolved S. C. Bone	Baltimore
3009	" " " "	No. 1 Peruvian Guano	Baltimore
3394	Wm. McKenney, Centreville, Md.	McKenney's Compound	Centreville
3391	" " "	No. 1 D. Wheat Fertz	Centreville
3390	" " "	Soluble No. 3 Phosphate	Centreville
3020	F. Mehring, Bruceville, Md.	Acid Phosphate	Mt. Airy
3032	" " " "	Ammoniated No. 2 Superphosphate.	Bruceville
3033	" " " "	Baumgardner's Mixture	Bruceville
3034	" " " "	Dissolved Raw Bone	Bruceville
3370	" " " "	Emmerts Half & Half	Bruceville
3031	" " " "	$26 Phosphate	Mt. Airy
3026	Miller Fert. Co., Baltimore, Md.	Clinch Phosphate	Monrovia
2946	" " "	Dissolved Raw Bone	Baltimore
2964	" " "	Dissolved S. C. Bone	Baltimore
2948	" " "	Ground Bone	Baltimore
2952	" " "	Harvest Queen Phosphate.	Baltimore

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3004	3.01	2½	....	.....	3.70	12.88	12	16.58	.. ....	$26.72	$21.90
2963	5.43	4	....	.. ....	...	.....	.....	24.06	22	23.15	.....
3626	1.69	1¼	2.70	2¼	4.08	9.31	10	13.39	11	21.39	18.69
3064	.....	.....	...	.....	.91	14.06	14	14.97	.....	14.06	14.00
3065	2.77	2½	2.50	2	2.57	9.03	7	11.60	9	23.19	19.10
2984	....	.....		.....	1.45	15.24	14	16.69	.....	15.24	14.00
3099	9.32	10	...	... .	5.36	5.69	.....	11.05	.....	38.01	30.00
3394	2.45	1½	1.22	1½	1.38	9.81	10	11.19	.....	21.17	18.00
3391	2.90	2	2.57	2½	2.25	8.89	7	11.14	.....	23.29	16.90
3390	.32	.30	1.70	3	1.44	13.91	12	15.35	.....	20.21	18.30
3020	.....	.....	...	... ...	2.11	15.77	13	17.88	... .	15.77	13.00
3032	1.55	1	2.00	¾	3.45	10.99	9	14.44	.....	21.91	14 55
3033	1.93	1	1.06	1	1.64	12.69	11	14.33	.....	23.06	17.20
3034	2.46	1	....	.....	1.37	16.40	14	17.77	.....	27.88	19.80
3370	1.56	1	.....	.....	2.29	15.71	12	18.00	..... .	24.90	17.40
3021	1.55	1	.89	¾	3.66	11.55	9	15.21	.....	21.60	14.55
3026	1.29	1	1.89	1½	1.63	8.00	7	9.63	9	16.34	14.10
2946	2.88	2½	....	.....	3.49	11.78	11	15.27	14	24.87	22.50
2964	.....	.....	....	.....	2.67	14.01	14	16.68	14	14.01	14.00
2948	3.16	3	.....	.....	.....	....	.....	18.20	15	23.52	.....
2952	1.66	1¼	3.03	2¼	1.38	10.85	10	12.23	11½	21.86	18 90

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3031	Miller Fertz. Co., Baltimore, Md.	Hustler Phosphate	Frederick
2953	" " " "	Pure Bone Meal	Baltimore
3362	" " " "	Robinson's Wheat Grower.	Belair
3333	" " " "	Special Mixture	New London
3320	" " " "	Special Potato Fertilizer	Fowblesburg
2945	" " " "	Special Wheat Grower	Baltimore
2969	" " " "	Standard Superphosphate.	Baltimore
3056	G. R. Mowell, Glencoe, Md.	Dissolved S. C. Rock	Glencoe
3057	" " " "	Standard Bone Phosphate	Glencoe
3074	Mt. Airy Mfg. Co., Baltimore, Md.	Dissolved S. C. Phosphate.	Cumberland
3388	" " " "	Piedmont Dis. Bone Phos. Potash Goods.	Greensboro
3369	" " " "	Piedmont Guano for Wheat.	Baltimore
3073	" " " "	Piedmont Pure Bone Meal.	Cumberland
3075	" " " "	Pure Dissolved Animal Bone.	Cumberland
3072	" " " "	Piedmont Pure Raw Bone Mixture.	Cumberland
3389	" " " "	Piedmont Potato Producer.	Greensboro
3581	" " " "	No. 1 Raw Bone Meal	Hollywood
3577	Nickerson Fert. Co., Easton, Md.	Bone & Potash	Centreville
3445	" " " "	Linthicum's Special Mixture.	Jessups
3573	" " " "	Mixture	Denton
3574	" " " "	Rock & Kainit	Centreville

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value Per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3031	1.71	1	2.35	2¼	1.57	9.45	9	11.02	10	$19.76	$16.65
2953	4.03	4	.....	.....	..	.....	.....	25.56	20	30.06	.....
3362	3.07	3	3.23	2½	4.12	6.53	10	10.65	.....	22.75	23.25
3333	2.53	2½	2.54	2½	4.55	8.90	10	13.45	.....	23.54	22 00
3320	1.05	1	4.77	5	1.76	7.77	7	9.53	9	18.30	17.60
2945	2.29	2	2.24	2	1.70	9.88	8	11.58	10	21.99	18.80
2969	3.31	2.85	2.64	2¼	1 87	10.70	10	12.57	11½	26.53	23.70
3056	.....	.....	.....	.....	2.35	13.09	14	15.44	15	13.09	14.00
3057	2.27	2	2.05	2	3.62	9.63	10	13.25	11	22.59	20.60
3074	....	.....	.....	.....	1.17	13.83	13	15.00	14	13.83	13.00
3388	.....	.....	1.03	1	2.48	10.52	10½	13.00	11½	12.54	11.90
3369	2.05	2	1.01	1	1.35	9.19	8	10.54	10	19.00	17.80
3073	4.58	5	.....	.....	.....	.....	.....	21.82	23½	26.34	.....
3075	2.79	2½	.....	.....	2.86	10.18	11	13.04	15	22.19	23.10
3072	1.44	1	1.09	1	3.07	8.13	7	11.20	11	17.01	14.80
3389	2.80	3	6.03	6	1.27	6.80	5	8.07	7	23.35	22.20
3581	3.05	3½	.....	.....	.....	.....	...	10.92	18	16.29	.....
3577	.72	½	3.21	3	1.37	10.62	7	11.99	8	18.93	13.50
3445	1.53	½	2.30	3	2.26	7.77	8	10.03	9	17.87	14.70
3573	.59	½	3.21	3	2.09	8.35	8	10.44	9	16.25	15.70
3574	.....	.....	2.07	1	1.45	8.78	8	10.23	8	11.43	9.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3578	Nickerson Fertilizer Co, Easton, Md.	Soluble Bone Phosphate & Potash Fertilizer.	Centreville
3590	" " "	South Carolina Bone & Potash.	Trappe
3545	" " "	S. C. Phosphate	Secretary
3564	" " "	S. C. Phosphate & Kainit	Ridgely
3576	" " "	S. C. Phosphate & Kainit.	Centreville
3575	" " "	S. C. Phosphate & Potash.	Centreville
3582	" " "	S C. Phosphate & Potash.	Centreville
3486	North Western Fert. Co., Chicago, Ill.	Prairie Phosphate	Laurel
3485	" " " "	Pure Ground Bone	Laurel
3450	G. Ober & Sons, Co, Baltimore, Md.	Dissolved Animal Bone Potash.	Baltimore
3408	" " " "	Dissolved Bone Phosphate	Baltimore
3548	" " " "	Dissolved Bone Phos & Potosh.	Hurlock
3547	" " " "	Farmers' Mixture	Hurlock
3403	" " " "	Farmers Standard Ammoniated Phosphate	Baltimore
3508	" " " "	J. H. Gassaway's Ammoniated Dissolved Bone.	Germantown
3511	" " " "	Pure Bone Meal	Gaithersburg
3510	" " " "	Special Ammoniated Dis. Bone.	Germantown
3566	Pacific Guano Co., New York.	Dis. Bone Phos. of Lime	Ridgely
3567	Patapsco Guano Co., Baltimore, Md.	Baltimore Soluble Phos	Hillsboro
3447	" " "	Coon Brand Guano	Cockeysville
3571	" " "	Dissolved Raw Bone	Hillsboro

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3578	.....	.....	3.09	2	1 31	10.41	10	11.72	12	$14.02	$12 40
3590	.....	¼	3.14	3	1.21	10.42	7	11.63	8	14.04	12.75
3545	.....	.....	.....	.....	1.27	13.77	13	15.04	15	13.77	13.00
3564	.....	.....	3.19	.....	1.31	9.53	.....	10.84	.....	13.24	.....
3576	.....	.....	1.86	.....	1.57	11.68	.....	13.25	.....	14.17	.....
3575	.....	.....	2.05	3	1.52	11.77	9	13.29	11.	14.43	12.40
3582	.....	.....	2.34	3	2.51	11.09	9	13.60	11.	14.43	12.80
3486	3.40	2	.....	.....	4.09	6.73	6	10.82	9	20.73	15.00
3485	5.02	3	.....	.....	.....	.....	.....	22.04	18	29.66	.....
3450	2.79	2½	3.38	2½	2.19	10.33	10	12.52	12	25.46	23.20
3408	.....	... ...	.....	.....	1.84	14.96	14	16.80	16½	14.96	14 00
3548	....	.....	2.56	2	1.25	13.95	10	15.20	12	17.01	12.40
3547	1.79	1	2.86	1½	1.17	10.40	8	11.57	11½	21.41	16.20
3403	2.49	2	2.43	1½	1.50	10.37	8	11.87	10½	23.24	18.16
3508	3.16	2½	3.62	3	1.85	10.24	9	12.09	11	26.50	22.00
3511	5.44	4	.....	.....	....	.....	.....	20.75	22	30.08	.....
3510	2.05	1½	2.36	1½	1.66	11.05	8	12.71	10½	22.77	17.10
3566	.....	.....	.....	.....	2.44	13.34	12	15.78	13	13.34	12.00
3567	.....	.....	1.97	1½	1.55	12.05	10	13.60	12	14.64	11.90
3447	1.25	1	4.20	3	1.71	9.22	8	10.93	.....	20.04	18.60
3571	2.65	11	.....	.....	4.20	11.59	12	15.79	13	24.38	21.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3449	Patapsco Guano Co., Baltimore, Md.	Grain & Grass Producer..	Cockeysville.....
3446	" " "	Pure Disolved S. C. Bone.	Cockeysville.....
3448	" " "	Special Wheat Compound Ammon. Super. Phos.	Cockeysville.....
3434	Wm. A. Pleasants, Baltimore, Md.	H. G. Wheat Fertilizer....	Baltimore.....
3432	" " "	No. 1 Peruvian Guano Guaranteed 6%	Baltimore.....
3533	" " "	Wheat Food for Wheat Rye and Grass.	Baltimore.....
3530	Pogue & Hartenstine, Rising, Sun, Md.	Rock and Potash.....	Rising Sun.....
3435	R. H. Pollock, Baltimore, Md.	Ammoniated Bone Phosphate.	Baltimore.....
3413	" " "	Dissolved Animal Bone....	Baltimore.....
3419	" " "	Dissolved S. C. Bone.....	Baltimore.....
3442	" " "	Ground Animal Bone.....	Baltimore.....
3443	" " "	Soft Ground Bone.....	Baltimore.....
3484	" " "	Soluble Bone Phosphate..	Maple Grove.....
3414	" " "	Special Wheat Grower.....	Baltimore.....
3539	Powell Fert. & Chem. Co., Baltimore, Md.	Red Bag.....	Cambridge .....
3494	Ramsburg Fertilizer Co., Frederick, Md.	Alkaline Phospho-Potassium.	Monrovia .....
3451	" " "	Dissolved Animal Bone....	Silver Spring.....
3496	" " "	Dissolved Bone Super-Phosphate.	Monrovia .....
3498	" " "	Dorseys Special Wheat Compound.	Monrovia .....
3493	" " "	Excelsior Half & Half.....	Monrovia .....
3491	" " "	Excelsior Plant Food.....	Mt. Airy .....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3449	....	1	2.35	2	1.53	10.09	10	11.62	12	$19.60	$18.20
3446	1.51	.....	.....	.....	1 97	14.19	14	16.16	.....	14.19	14.00
3448	2.25	2	2.59	2	3.95	10.05	10	14.00	13	20.77	21.80
3434	2.02	2	5.07	4	1.30	10.20	8	11.50	8	24.15	19.60
3432	6.67	6	.....	.....	6.75	10.03	.....	16.78	.....	36.10	18.00
3533	1.44	1	2.99	2	1.04	10.17	8	11.21	.....	20.13	14.60
3530	1.70	½	1.64	½	.97	9.62	5	10.59	.....	18.86	8.00
3435	2.13	2	2.12	2	2.18	9.71	10	11.89	11	21.47	20.60
3413	2.89	2¼	.....	...	4.11	11.64	12	15.75	.....	25.11	21.15
3419	....	.....	....	.....	1.53	14.89	14	16.42	16	14.89	14.00
3442	5.12	4	.....	.....	.....	....	.....	23.18	22	24.53	.....
3443	3.02	3	.....	.....	14.26	5.18	.....	19.44	.....	17.40	.....
3484	.....	.....	2.26	2	1.09	11.44	11	12.53	12	14.14	13.40
3414	1.19	1	3.25	2	1.92	9.69	9	11.61	10.00	19.60	16.40
3539	1.38	2	2.05	2	2.94	9.48	8	12.42	10	19.32	18.80
3494	.71	¼	2.19	2	2 58	9.86	10	12.44	.....	17.70	14.75
3451	2.01	2	.....	.....	4 19	10.23	10	14.42	13	20.82	19.80
3496	....	.....	.....	.....	.40	16.77	14	17.17	16	16.77	14.00
3498	1.83	1	.34	1	4.16	10.43	8	14.59	.....	20.85	13.60
3493	1.23	1	.43	1	3.25	10.80	10	14.05	12	19.03	17.20
3491	2.40	2	1.28	1	3.08	9.44	9	12.52	11	21.66	19.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3497	Ramsburg Fertilizer Co., Frederick, Md.	Old Virginia Compound	Monrovia
3452	" " " "	Pure Raw Bone	Silver Spring
3513	Rasin Fertilizer Co., Baltimore, Md.	Acid Phosphate	Gaithersburg
3454	" " " "	Ammoniated Superphosphate.	Cumberland
3404	" " " "	Bone and Potash Fertilizer.	Baltimore
3436	" " " "	Dissolved Bone	Baltimore
3406	" " " "	Empire Guano	Baltimore
3521	Henry Reckord Mfg. Co., Bel Air, Md.	Animal Bone Phosphate	Aberdeen
3530	" " " "	Dissolved S. C. Bone	Belair.
3531	" " " "	Fine Ground Bone	Belair.
3431	" " " "	Raw Bone	Baltimore
3401	" " " "	Special Compound	Baltimore
3523	John S. Reese & Co., Baltimore, Md.	Ammoniated Bone Phosphate Mixture.	Elkton
3400	" " " "	Excellenza Guano	Baltimore
3444	Reindollar & Co., Taneytown, Md.	Reindollar's Fish Mixture.	Baltimore
3505	" " "	Fish Phosphate	Taneytown
3506	" " "	Special Mixture	Taneytown
3472	Reinhart & Clemson, Union Bridge, Md.	No. 2 Bone Phosphate	Union Bridge
3473	" " "	No. 3 Bone Phosphate	Union Bridge
3546	E. C. Ross, Seaford, Del.	High Grade Acid Phosphate.	Hurlock
3478	Charles Schaeffer, Westminster, Md.	Big Gun Ammoniated Dis. Bone Phosphate.	Westminster

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3497	2.38	1¼	1.88	2	3.14	9.52	8	12.66	10	$22.32	$15.55
3452	4.28	4.08	.....	.....	....	.....	.....	24.37	26	31.62	.....
3513	.....	.....	.....	.....	.66	15.61	14	16.27	15	15.61	14.00
3454	1.54	1	1.22	1	1.80	11.07	8	12.87	9	20.20	14.20
3404	.....	.....	1 09	1¼	2.58	11.85	12	14.43	13	13.97	13.65
3436	2.91	2	.....	.....	2.98	10.02	10	13.00	12	22.52	19.20
3406	2.88	2.43	1.80	1½	2.23	9.39	8	11.62	10	23.05	19.59
3521	1.77	2½	2.33	1½	1.86	10.30	8	12.16	.....	21.12	18.60
3532	.....	.....	.....	.....	1.29	15.93	14	17.22	.....	15.93	14.00
3531	4.17	3	.....	.....	....	.....	.....	25.34	25	32.03	.....
3431	4.90	5.29	....	.....	....	.....	.....	19.63	20.38	26.38	.....
3401	2.25	2.03	2.03	2.13	2.24	9.42	10.66	11.66	13.18	21.42	22.52
3523	1.45	1	3.65	3	1.11	8.28	10	9.39	12	18.61	19.20
3400	2.52	2¼	1.50	1.20	1.67	9.67	8½	11.34	10½	21.66	19.35
3444	2.37	2	2.85	2	1.79	9.06	8	10.85	.....	21.90	17.60
3505	2.59	2	2.06	2	1.64	9.36	8	11.00	.....	22.04	17.60
3506	1.44	1	1.66	1	2.27	6.71	7	8.98	.....	15.39	12.40
3472	1.74	1.55	2.02	2½	1.79	8.73	8.27	10.52	11	18.69	18.72
3473	1.13	.78	3.65	3.21	1.13	8.90	8.09	10.03	9	18.50	15.86
3546	....	.....	.....	.....	2.91	12.74	13	15.65	14	12.74	13.00
3478	2.19	2	2 46	2	1.75	11.01	10	12.76	.....	23.29	20.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3477	Charles Schaeffer, Westminster, Md.	Dissolved S. C. Bone	Westminster
3475	" " "	Governor	Westminster
3476	" " "	Leader	Westminster
3474	" " "	Super "A"	Westminster
3529	Scott Fertilizer Co., Elkton, Md.	Potato Fertilizer No. 2	Elkton
3527	" " " "	Pure Dissolved Bone	Elkton
3516	" " " "	Pure Ground Bone	Aberdeen
3528	" " " "	Standard Phosphate	Elkton
3515	" " " "	Sure Growth Super Phos.	Aberdeen
3526	" " " "	Tip Top Soluble Bone	Elkton
3525	" " " "	Tip Top Soluble Bone & Potash.	Elkton
3519	Sharpless & Carpenter, Philadelphia, Pa.	Dissolved Bone Phos	Aberdeen
3517	" " "	Gilt-Edge Potato Manure.	Aberdeen
3518	" " "	No. 1, Bone Phosphate	Aberdeen
3502	D. A. Sharretts, York Road, Md.	Ammoniated Super Phos.	Woodsboro
3503	" " "	Bone Phosphate	Woodsboro
3437	G. W. Sharretts, Baltimore, Md.	Ammoniated Bone	Baltimore
3463	J. D. Simmons, Hagerstown, Md.	Wheat & Clover Producer	Hagerstown
2957	Slingluff & Co., for Md. Grange Agency, Balto.	Agencys' Favorite	Baltimore
3427	Slingluff & Co., Baltimore.	Ammoniated Bone	Ellicott City
3415	" " "	Baltimore Dis. Bone	Baltimore

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3477	.....	.....	.....	.....	.94	15.13	13	16.07	14	$15.13	$13.00
3475	1.65	1½	2.54	2½	1.03	10.63	9	11.66	.....	20.87	20.80
3476	1.15	1	1.52	1½	2.31	9.00	8	11.31	.....	17.16	14.10
3474	1.03	¾	1.29	1	1.10	8.81	7½	9.91	8½	15.61	11.35
3529	2.91	2	4.28	4	2.49	8.36	8	10.85	.....	24.53	19.60
3527	2.91	2½	.....	.....	2.57	10.43	13	13.00	15	22.79	24.30
3516	4.93	4	.....	.....	.....	.....	.....	24.44	22	27.26	.....
3528	1.25	1½	1.72	2	1.82	12.92	8	14.74	.....	22.06	16.10
3515	2.95	2	3.44	2	2.19	9.09	9	11.28	.....	24.51	18.80
3526	.....	.....	.....	.....	1.46	14.85	13	16.31	.....	14.85	13.00
3525	.....	.....	2.67	2	1.25	12.15	11	13.40	.....	15.32	3.00
3519	3.06	3	5.09	5	3.26	8.93	8	12.19	.....	26.95	23.60
3517	3.09	3	6.59	6	2.45	8.25	7	10.70	.....	27.23	23.40
3518	2.51	2½	2.75	2	2.84	9.28	8½	12.12	.....	23.11	19.70
3502	1.61	1	1.54	1	1.89	9.07	9	10.96	.....	18.38	14.80
3503	2.22	2	2.04	1½	1.56	8.35	8	10.91	.....	19.66	17.10
3437	.89	½	1.83	1	1.16	5.02	5	6.18	6	11.22	9.10
3463	2.14	2	6.43	6	3.05	12.71	12	15.76	.....	29.93	26 40
2957	2.74	.....	2.72	.....	2.34	12.65	.....	14.99	.....	27.52	.....
3427	2.94	2½	2.91	2½	1.32	9.99	9	11.31	.....	24.51	20.80
3415	1.72	1	2.86	1	1.45	16.34	10	17.79	.....	28.49	16.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3440	Slingluff & Co., Baltimore, Md.	Bone	Baltimore
3416	" " "	Bone & Potash	Baltimore
3428	" " "	British Mixture	Ellicott City
3425	" " "	Dissolved S. C. Bone	Ellicott City
3407	" " "	McAfee's Stand. Ammoniated Bone Phosphate.	Baltimore
3439	" " "	Native Super Phosphate	Baltimore
3433	" " "	Pure Raw Bone Dissolved	Baltimore
3487	" " "	Special Bone Phosphate	Sykesville
3514	Wm. A. Smith, Woodsboro, Md.	Crop Grower	Washington Grove.
3509	" " "	Dissolved Bone	Germantown
3469	G. W. Stocksdale Thurmont, Md.	Ammoniated Super Phos.	Thurmont
3468	" " "	Dis. Animal Bone Phos.	Thurmont
3466	J. W. Stonebraker & Son., Hagerstown, Md.	Bone Meal	Hagerstown
3467	" " "	Dis. Bone Phos.	Hagerstown
3465	" " "	Special	Hagerstown
3464	" " "	Standard Dis. Bone	Hagerstown
3470	Jos. A. Stouffer, New Windsor, Md.	Butcher House Phos.	New Windsor
3471	" " "	Soluble Wheat Grower	New Windsor
3405	W. H. Street & Co., Baltimore, Md.	Ammoniated Dis. Bone	Baltimore
3495	J. W. Sullivan, Monrovia, Md.	Sullivan's Sure Success	Monrovia
3410	Susquehanna Fert. Co., Baltimore, Md.	Ammoniated Bone Phos.	Baltimore

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3440	5.56	.....	.....	.....	.....	.....	.....	19.92	.....	$28.82	.....
3416	.....	.....	2.11	2	.80	11.08	10	11.88	11	13.51	12.40
3428	2.54	2½	2.94	2½	3.61	10.17	8	13.78	.....	24.93	19.60
3425	.....	.....	.....	.....	.91	14.24	14	15.15	.....	14.24	14.00
3407	2.80	2	1.37	.95	2.57	10.59	8	13.16	9	24.02	17.15
3439	2.45	.....	3.36	.....	1.04	11.03	.....	12.07	.....	24.57	.....
3433	2.90	2½	.....	.....	1.05	12.97	11	14.02	14	24.89	22.50
3487	1.21	1	.....	.....	.78	13.29	12	14.07	13	20.05	18.00
3514	1.80	1¾	1.81	1¾	2.61	10.20	8½	12.81	.....	21.02	15.20
3509	2.09	2	.....	.....	3.03	10.98	10	14.01	13¾	21.27	20.25
3469	1.21	¾	2.30	2¼	.64	9.50	8	10.14	.....	17.71	14.10
3468	1.62	1	2.26	2¼	1.11	9.72	9	10.83	.....	19.45	16.05
3466	4.88	6	.....	.....	.....	.....	.....	21.06	20½	29.34	.....
3467	1.35	1	1.88	2	2.60	12.95	10	15.55	.....	23.03	17.00
3465	2.36	2	4.69	4	1.90	10.61	10	12.51	.....	25.64	22.00
3464	2.28	2	.....	.....	5.69	12.55	10	18.24	14	25.31	24.00
3470	1.20	¾	2.65	2½	1.74	9.80	8	11.54	9	19.05	15.45
3471	.67	¼	3.26	3	.93	10.36	7½	11.29	9½	18.26	13.95
3405	1.86	1½	2.41	2	1.70	9.75	9	11.45	10½	20.71	18.20
3495	2.10	2	2.11	2	2.22	11.75	10	13.97	.....	23.84	20.00
3410	2.20	2	2.32	2	3.70	10.08	9	13.78	11	23.24	20.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3409	Susquehanna Fertz. Co., Baltimore, Md.	Pure Bone Phosphate	Baltimore
3417	" " "	Superior Rock Phos	Baltimore
3490	" " "	XXV Phosphate	Hoods Mills
3424	Talbott & Clark, Ellicott City, Md.	Ammoniated Bone Phos.	Ellicott City
3453	W. H. Tenny & Son., Georgetown, D. C.	Bone	Silver Spring
3460	D. A. Thomas, Hagerstown, Md.	Bone Mixture	Hagerstown
3458	" " "	Dissolved Bone	Hagerstown
3459	" " "	Fine Raw Bone	Hagerstown
3462	" " "	Farmers Mixture	Hagerstown
3461	" " "	Pure Dis. S. C. Bone	Hagerstown
3455	I. P. Thomas & Sons Co., Philadelphia, Pa.	S. C. Phosphate	Hancock
3457	Thompson & Edwards, Chicago Ill.	Blood & Bone Animal Guano.	Keedsyville
3456	" " "	Pure Fine Ground Bone	Keedysville
3560	Wm. B. Tilghman Co., Salisbury, Md.	Bone & Tankage Mixture for Wheat & Grass	Westover
3561	" " " "	Fish Mixture	Salisbury
3549	Walter Todd, Baltimore, Md.	No. 1, Standard Bone Phos. for Wheat.	Hurlock
3563	E. S. Truitt, Salisbury, Md.	Fish Mixture XX	Salisbury
3550	Tygert Allen Fertz. Co., Philadelphia, Pa.	Allens Alkaline Bone Phosphate.	Pocomoke
3553	" " " "	Allens Pure Ground Raw Bone.	Pocomoke
3554	" " " "	Cloggs Soluble Bone & Potash.	Pocomoke
3556	" " " "	H. G. Dis. S. C. Bone	Pocomoke

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3409	2.85	2	2.70	2	6.33	11.49	9	17.82	11	$28.84	$20.00
3417	....	.....	.....	.....	1.51	15.30	14	16.81	15	15.30	14.00
3490	1.36	1½	1.25	1	2.07	9.77	8	11.84	10	18.29	16.30
3424	2.40	2	2.53	2	3.35	10.47	9	13.82	14	24.30	21.80
3453	5.12	.....	.....	.....	.....	.....	.....	19.33	.....	24.09	.....
3460	2.01	1½	3.29	2½	2.74	10.87	10	13.61	.....	24.00	19.00
3458	3.64	2½	2.21	1½	2.72	9.57	10	12.29	.....	26.24	21.00
3459	5.02	4	.....	.....	.....	.....	.....	22.86	20½	30.71	.....
3462	1.27	1	2.19	2	3.01	8.88	8	11.89	.....	18.47	14.60
3461	.....	.....	.....	.....	.66	14.70	14	15.36	.....	14.70	14.00
3455	..	.....	.....	.....	1.30	14.56	13	15.86	14	14.56	13.00
3457	5.57	6½	.....	.....	7.50	8.50	.....	16.00	10	31.41	23.50
3456	3.04	3	.....	.....	.....	.....	.....	22.49	22	27.88	.....
3560	3.57	3	1.66	1	2.72	8.75	8	11.47	.....	24.49	19.60
3561	4.45	3	1.00	1	3.91	7.44	6	11.35	.....	25.63	17.20
3549	1.52	1½	3.56	2	1.15	10.04	10	11.19	12	20.86	19.10
3563	3.39	3	2.78	2	1.34	7.63	8	8.97	10	22.91	21.80
3550	....	.....	2.09	4	1.65	10.60	9	12.25	11	13.35	13.80
3553	4.50	4	....	.....	.....	.....	.....	19.87	20	31.55	.....
3554	....	.....	1.01	1	1.65	10.33	10	11.98	.....	12.00	11.00
3556	....	.....	.....	.....	1.63	13.48	14	15.11	15	13.48	14.00

Table of Analysis and Valuation of Fertilizers Made at the

No	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3504	Tygert Allen Fertz. Co., Philadelphia, Pa.	Pure Dissolved Bone	Taneytown
3551	" " " "	Standard Bone Phos	Pocomoke
3520	" " " "	Star Bone Phos	Aberdeen
3552	" " " "	Star Pure Ground Bone	Pocomoke
3555	" " " "	Star Soluble Bone & Potash.	Pocomoke
3507	J. Tyson & Son., Frederick, Md.	Ammoniated Super Phos. of Lime.	Barnesville
3589	" " "	Ammoniated Super Phos.	Hyattstown
3499	" " "	Dis. S. C. Bone	Ijamsville
3500	Virginia Carolina Chem Co., Richmond, Va.	D V. Stouffer's Special Compound for Wheat.	Frederick
3501	" " "	D. V. Stouffer's Ammoniated Bone Phosphate.	Frederick
3592	" "	Stouffer's Standard	New London
3411	" " "	Guaranteed 14% Acid Phosphate.	Canton
3329	" " "	Guaranteed 14% Acid Phosphate.	Dickerson
3585	" " "	Special	Buckeystown
3537	Joshua Walker Baltimore, Md.	Dissolved Bone Phos	Westminster
3536	" " " "	Dissolved S. C. Phos	Westminster
3534	" " " "	Old Pittsburg Ammoniated Super Phosphate.	Westminster
3535	" " " "	Victoria Bone	Westminster
3541	S. L. Webster, & Son., Cambridge, Md.	No. 1, Ammoniated Bone Phosphate.	Cambridge
3542	" " "	No. 2, Ammoniated Bone Phosphate.	Cambridge
3544	" " "	Poudrette Mixture	Cambridge

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3504	4.45	3	.....		1.39	13.74	12	15.13	.....	$30.67	$23.40
3551	2.18	2	2.75	2	1.87	9.07	8	10.94	.....	21.29	17.60
3520	2.65	2¼	3.29	2½	1.66	10.14	8½	11.80	10½	22.36	20.65
3552	4.30	4	.....		.....	.....	.....	19.58	22	24.70	.....
3555	.....	.....	1.80	2	1.75	10.77	10	12.52	11	13.27	12.40
3507	1.48	2	1.35	1	2.69	11.19	7	13.88	.....	20.83	15.40
3589	.62	2	.37	1	2.38	12.69	7	15.07	8	18.89	16.00
3499	.....	.....	.....	...	1.59	14.71	14	16.30	.....	14.71	14.00
3500	1.38	1	1.21	1	2.50	11.82	8	14.32	.....	21.03	13.60
3501	1.85	1½	1.52	1½	3.55	11.59	11	15.14	.....	23.11	19.20
3592	2.07	2.85	1.85	1½	1.15	12.19	10	13.34	.....	23.38	22.05
3411	.....	.....	....	.....	1.40	15.32	14	16.72	.....	15.32	14.00
3329	.....	.....	.....	.....	1.70	15.28	14	16.98	.....	15.28	14.00
3585	2.77	.....	5.74	.....	10.38	8.47	.....	18.85	.....	30.38	.....
3537	2.64	2	.56	2	2.49	10.73	10	13.22	12	20.71	21.20
3536	.....	.....	.....	.....	.21	16.11	14	16.32	15	16.11	14 00
3534	2.92	2.43	2.33	1½	2 57	8.76	8	11.33	10	23.14	19.59
3535	.....	.....	1.39	1¼	1.96	12.44	12	14.40	14	14.61	14.05
3541	3.50	3.16	2.71	2½	4.14	9.51	7.70	13.65	13.37	27.10	24.62
3542	2.14	2½	2.52	2½	2 20	9.36	7.48	11.56	9.53	21.49	20.21
3544	.52	.51	3.29	3.01	1 35	5.55	6½	6.90	6 68	12.32	13.01

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling
3543	S. L. Webster & Son., Cambridge, Md.	The Times Bone Phos.	Cambridge
3524	M. E. Wheeler & Co., New York.	Electrical Dis. Bone	Elkton
3430	" " "	H.G. Electrical Dissolved Bone Fertilizer.	Baltimore
3588	" " "	H.G. Electrical Dissolved Bone Fertilizer.	Thurmont
3418	" " "	H. G. Royal Wheat Grower.	Baltimore
3568	Williams & Clark, New York.	Acorn Brand Acid Phos.	Hillsboro
3569	" " "	Acorn Brand Acid Phos.	Hillsboro
3593	" " "	No. 1	Greensboro
3557	F. M. Wilson, Pocomoke Md.	Peninsula Ammoniated Super Phosphate.	Pocomoke
3423	Robert A. Wooldridge Co., Baltimore, Md.	Bone & Potash Mixture.	Ellicott City
3421	" " " "	Little Giant A. A. Phos.	Ellicott City
3412	" " " "	Triumph Bone Phos.	Baltimore
3422	" " " "	XXTRA Acid Phos.	Ellicott City
3430	Zell Guano Co., Baltimore, Md.	Calvert Guano	Baltimore
3479	" " "	Dis. Bone Phos.	Westminster
3586	" " "	Dis. Bone Phos.	Crumpton
3492	" " "	Dis. Bone Phos & Potash.	Mt. Airy
3429	" " "	Economizer	Baltimore

Maryland Agricultural College, September, 1896, to January, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value Per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3543	.79	½	3.25	2½	.94	9.00	9	9.94	9.65	$16.98	$15.19
3524	.....	.....	.....	.....	1.06	14.61	14	15.67	16	14.61	14.00
3420	.....	.....	.....	.....	1.61	15.09	13	16.70	15	15.09	13.00
3588	....	.....	.....	.....	1.30	15.37	13	16.67	15	15.37	13.00
3418	1.29	1	2.35	2	1.42	10.56	8	11.96	9	19.74	15.20
3568	.....	.....	.....	.....	1.34	14.24	13	15.58	.....	14.24	13.00
3569	.....	.....	.....	.....	.84	13.84	12	14.68	13	13.84	12.00
3593	1.09	¾	2.50	2¼	3.06	7.22	7	10.28	.....	15.39	12.90
3557	1.20	1	1.34	1½	1.29	12.11	10	13.40	.....	20.24	16.50
3423	.....	.....	2.06	2	1.32	11.26	11	12.58	.....	13.84	13.00
3421	1.37	1	2.35	2	2.06	9.83	9	11.89	.....	19.50	15.80
3412	1.79	½	4.00	4	1.59	8.77	8	10.36	9¼	20.84	15.85
3422	.....	.....	.....	.....	1.74	14.34	14	16.08	....	14.34	14.00
3430	1.37	¾	1.67	1½	2.87	9.93	9	12.80	11	19.42	15.75
3479	.....	.....	.....	.....	2.05	14.27	14	16.32	16	14.27	14.00
3586	....	.....	.....	.....	1.96	15.40	14	17.36	16	15.40	14.00
3492	.....	.....	3.16	2	2.94	11.36	10	14.30	12	15.70	12.80
3429	1.44	1	1.25	1	2.75	10.88	9	13.63	11	20.28	16.00

Bulletin No. 45, February, 1897.

Table Showing the Mechanical Analysis of Ground Bone.

(The Chemical Analysis is Given in Preceding Table.)

No	Name and Address of Manufacturer.	Name of Fertilizer.	Fine Less than 1-50 inch.	Fine-Medium, 1-25 to 1-50 inch.	Medium, 1-25 to 1-12 inch.	Coarse, Larger than 1-12 inch.
3337	J. H. Armstrong & Co., North East, Md.	Pure Raw Bone	23	30	32	15
2947	Baugh & Sons Co., Baltimore, Md.	Bone Meal, war. pure	29	31	40	0
3331	" " " "	Bone Meal	32	36	32	0
3344	Berg Company, Philadelphia, Pa.	Electrical Raw Bone Fine	17	40	22	21
3067	Chas. E. Bond, Spencerville, Md.	Ground Bone	11	30	47	12
3006	John Bullock & Son, Baltimore Md.	Pure Ground Raw Bone	23	39	19	19
3295	Chemical Co., of Canton, Baltimore, Md.	Baker's Standard Ground Bone	30	70	0	0
3330	Josiah Cope & Co., Lincoln University, Pa.	Pure Steamed Bone	25	45	20	10
3014	Detrick Fertilizer & Chemical Co., Baltimore, Md.	Pure Fine Ground Animal Bone.	38	62	0	0
3283	Fairbanks Canning Co., Chicago, Ill.	Steamed Bone	48	32	20	0
3334	W. S. Farmer & Co., Baltimore, Md.	Ground Bone	35	17	20	28
3010	" " " "	Pure Bone Meal	21	40	39	0
3051	Griffith & Boyd, Baltimore, Md.	Pure Fine Ground Bone Meal	14	70	16	0
3017	" " " "	Strictly Pure Raw Bone Meal	14	78	8	0
3031	Griffith, Turner & Co., Baltimore, Md.	Ground Bone	18	27	34	21
3306	Hanover Bone Fertilizer Co., Ltd., Hanover, Pa.	Hanover Pure Bone Meal	42	46	12	0
2944	Joshua Horner, Jr. & Co., Baltimore, Md.	Slaughter House Bone Dust	31	16	34	19
2988	Lazaretto Guano Co., Baltimore, Md.	Pure Ground Animal Bone	25	32	28	15
2998	Lister Agricultural Chemical Works, Newark, N. J.	Pure Raw Bone Meal	25	48	27	0
2963	Maryland Fertilizer Co., Baltimore, Md.	Pure Fine Ground Animal Bone.	4	10	43	43
2948	Miller Fertilizer Co., Baltimore, Md.	Ground Bone	48	32	20	0
2953	" " " "	Pure Bone Meal	31	37	32	0
3073	Mt. Airy Manufacturing Co., Baltimore, Md.	Piedmont Pure Bone Meal	18	30	52	0
3581	" " "	No. 1 Raw Bone Meal	34	46	13	7
3485	North Western Fertilizer Co., Chicago, Ill.	Pure Ground Bone	33	40	21	6
3511	G. Ober & Sons Co., Baltimore, Md.	Pure Bone Meal	24	68	8	0
3442	R. H. Pollock, Baltimore, Md.	Ground Animal Bone	14	19	26	41
3452	Ramsburg Fertilizer Co., Frederick, Md.	Pure Raw Bone	49	30	21	0
3531	Heery Reckord Mfg. Co. Belair, Md.	Fine Ground Bone	47	36	13	4
3431	" " " " "	Raw Bone	34	23	34	9

Table Showing Mechanical Analysis of Ground Bone.—Continued.

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Fine Less than 1-50 inch.	Fine-Medium, 1-25 to 1-50 inch.	Medium, 1-25 to 1-12 inch.	Coarse, Larger than 1-12 inch.
3516	Scott Fertilizer Co., Elkton, Md.	Pure Ground Bone	14	33	32	21
3440	Slingluff & Co., Baltimore, Md.	Bone	33	31	32	4
3466	J. W. Stonebraker & Son., Hagerstown, Md.	Bone Meal	32	48	20	0
3453	W. H. Tenney & Son., Georgetown, D. C.	Bone	15	30	33	22
3459	D. A. Thomas, Hagerstown, Md.	Fine Raw Bone	31	44	25	0
3456	Thompson & Edwards, Chicago, Ill.	Pure Fine Ground Bone	62	24	11	3
3552	Tygert-Allen Fertilizer Co., Philadelphia, Pa.	Star Pure Ground Bone	28	31	31	10
3553	" " "	Allen's Pure Ground Raw Bone.	46	24	27	3

LIST OF FERTILIZERS LICENSED FOR SALE IN MARYLAND FOR THE YEAR ENDING JANUARY 31st, 1897.

(Supplement to the list published in Bulletin, No. 40, August, 1896.)

ALEXANDRIA FERTILIZER AND CHEMICAL COMPANY, ALEXANDRIA, VA.

Ammoniated Dissolved Bone.

ARMSTRONG, J. H. & CO., NORTH EAST, MD.

Pure Raw Bone.

BALTIMORE GUANO CO., BALTIMORE, MD.

Baltimore Special.
B. G. Ammoniated Bone.
Farmers' Alkaline Bone.
Farmers' Dissolved Bone.

BAUGH & SONS CO., BALTIMORE, MD.

Reindollar's Fish Mixture.
Reindollar's Special Mixture.
Special Tomato Compound.

BETTS, B. A., CHEWSVILLE, MD.

Dissolved Ammoniated Bone.

BIRELY, A. D. & SON, LADIESBURG, MD.

Ammoniated Bone Phosphate.
Dissolved Bone.

BISH, E. M.,

S. C. Rock.

BOND, C. E., SPENCERVILLE, MD.

Dissolved Bone.
Ground Bone.

CHEMICAL CO., OF CANTON, BALTIMORE, MD.

Baker's Dissolved Bone Phosphate.
Baker's H. G. Standard Guano.
Dissolved S. C. Bone.
Soluble Bone and Potash.
Red Clover.
Dissolved Animal Bone.
Special Potato Manure, C. C. C.
Baker's Special.
Baker's Standard Bone.

CLENDENNIN, E. A., & BRO., COLORA, MD.

Farmers' Favorite Vegetator.
H. G. Acid Phosphate.
National Standard Ammoniate Phosphate.
Pure Ground Bone.
Special Potato and Truck Compound.

COPE, JOSIAH, & CO., LINCOLN UNIVERSITY, PA.

Ammoniated Bone Phosphate.

CROCKER FERTILIZER & CHEMICAL CO., BUFFALO, N. Y.

Dissolved Animal Bone.
H. G. Cereal Guano.

CUMMINGS, A. LEE, SMYRNA, DEL.

Soluble Bone Potash.

DETRICK FERTILIZER & CHEMICAL CO., BALTIMORE, MD.

Detricks' Ammoniated Bone Super-Phosphate.
Detricks' Challenge.
Detricks' Farmers Friend.

DeLASHMUTT, E. E., FREDERICK, MD.

DeLashmutts' Mixture.

DORSEY, JOSHUA, ELLICOTT CITY, MD.

Mixture D Phosphate.

DUDLEY & CARPENTER, BALTIMORE, MD.

California Tobacco Compound.
Dissolved S. C. Rock.
Special Tobacco Plant Guano.
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MARYLAND

Agricultural Experiment Station.

BULLETIN NO. 46.

Corn and Potato Experiments.

COLLEGE PARK, MD.

MARCH, 1897.

MARYLAND

Agricultural Experiment Station.

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The bulletins of the Station will be mailed free to any citizen of Maryland who sends his name and address to the Station for that purpose.

Correspondents will please notify the Director of changes in their post-office address, or any failure to receive the bulletins.

ADDRESS,

MARYLAND AGRICULTURAL EXPERIMENT STATION,

COLLEGE PARK, MD.

CORN AND POTATO EXPERIMENTS.

SUMMARY OF RESULTS.

(CORN.)

1.—The average results of three years' experiments in fertilizing corn would indicate that it is not profitable to apply fertilizer to this crop on our soil.

2.—Crimson clover plowed down for corn increased the yield 6.7 bushels to the acre.

3.—Crimson clover plowed down for corn on the same land two years in succession, yielded 46 bushels of corn the first year and 53.4 bushels the second year, of 7.4 bushels per acre more the second year.

4.—Three years' tests of wide and narrow rows for corn gave slightly better yields for wide rows.

5.—Four years' tests of deep and shallow cultivation of corn give substantially the same yields.

6.—Three years' tests of Frequent vs. Unfrequent Cultivation of corn give slightly better yields from Unfrequent Cultivation.

7.—In three years' tests of Drilled vs. Checked Corn there was a gain of 10 per cent. in favor of Drilled Corn.

8.—In a test of different quantities of lime, ten bushels to the acre proved most profitable for the first crop.

9.—In the test of early varieties of potatoes those giving the largest yields were: Van Guard, Summit, Milwaukee, Irish Cobler, Lee's Favorite and Early Maine.

10.—Results of fertilizer test showed, (a) a complete fertilizer gave the best yield; (b) a mixture of dried blood and nitrate of soda gave better results than dried blood alone; (c) Sulphate of Potash was best potash salt for potatoes, muriate next, and kainit gave the poorest results.

11.—Three years' tests of Early vs. Late Cultivation of potatoes, give rather better yields for early cultivation.

12.—Four years' tests of Ridge vs. Level Cultivation of potatoes, give slightly better yields for ridge culture.

13.—Three years' tests of Deep vs. Shallow Cultivation for potatoes give substantially similar results.

14.—Three years' tests of Wide and Narrow Rows for potatoes give decidedly better yields for the narrow rows.

CORN EXPERIMENTS 1895 and 1896.

By Robert H. Miller and E. H. Brinkley.

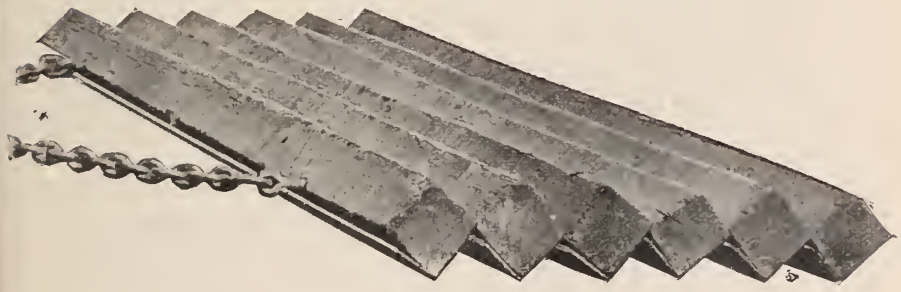
The following experiments were made with corn the season of 1895:

1 st. Fertilizer test.
2nd. Wide and Narrow Rows.
3rd. Deep vs. Shallow Cultivation.
4th. Frequent vs. Unfrequent Cultivation.
5th. Drilled vs. Checked Corn.
6th. Effect of Crimson Clover plowed Down for Corn.

The land on which all the above tests were made except the one with crimson clover, is a clay loam, and had been in wheat in 1893 followed by hay in 1894. In March, 1895, it was plowed, and May 15th, after being thoroughly prepared with spring tooth harrow and rubber, 300 pounds of fertilizer was drilled in per acre on all the plots except the check plots in the fertilizer test. The fertilizer was composed as follows:

Dissolved S. C. Rock.....	1100	lbs.
Tankage	500	lbs.
Nitrate of Soda.....	100	lbs.
Muriate of Potash.....	300	lbs.

The plots were all planted on May 17th and 18th.



LAND RUBBER.

The above illustration shows the implement used in preparing the ground mentioned in these tests. This is a home-made appliance and has proven to be novel to most visitors at the Station, and has also elicited many inquiries. From these facts together with the points that this implement is inexpensive and does its work more thoroughly and in a manner different from any similar device known, it has been deemed worthy of description.

The implement consists in the main of six pieces of 4x4 inch scantling, seven feet long, bolted together; the bolts run diagonally

through the pieces, which bring the diagonally opposite corners together, making the top and bottom present corrugated surfaces. There are three bolts used to fasten the pieces together which are made of ⅝ inch round iron. One bolt is placed in the center and the others one foot from either end. The outside bolts have an eye instead of plain head, by means of which a forked chain is attached for drawing the implement. The front cutting edges of the implement as is seen in the illustration are protected and their efficiency aided by having them bound with flat band iron two inches wide and one-fourth inch thick.

This size rubber is found to be heavy enough and well adapted for ordinary work, when constructed of oak wood as is the one at the Station, but if made of pine or any light wood it will require weighting.

FERTILIZER TESTS.

Two plots were used in this test. On one of them 300 lbs. per acre of the fertilizer described above was applied just before planting the corn; the other plot receiving none. The rows were laid off three feet nine inches, and corn dropped two grains in a place every 15 inches, and afterwards thinned to one stalk.

The corn was cultivated five times on the following dates: June 3rd, 7th, 17th, 26th and July 8th.

In the following table will be found the yield of corn and fodder on the respective plots.

TABLE I.

YIELD OF CORN AND FODDER PER ACRE FROM FERTILIZED VS. UNFERTILIZED PLOTS.

	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder lbs.
Fertilized	51.9	2.4	54.3	3187
Unfertilized	46.4	1.9	48.3	2695
Gain from Fertilizing	5.5	0.5	6.0	492

As will be seen from the above table, there was a gain of six bushels of corn to the acre from the application of the fertilizer, but this increased yield was not sufficient to pay the cost of the fertilizer applied.

WIDE AND NARROW ROWS.

The plot on which this test was made was prepared for planting and cultivated as described in fertilizer test. It was planted in alternate sections of wide and narrow rows; there being two sections each of wide and narrow rows. The wide rows were five feet and the narrow rows three feet nine inches. The wide rows were thinned out to one stalk every twelve inches, and the narrow rows one stalk to every fifteen inches; this leaving approximately the same number of stalks to the acre.

The following table gives the yield of corn and fodder.

TABLE II.

YIELD OF CORN AND FODDER PER ACRE FROM WIDE VS. NARROW ROWS.

	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder lbs.
Wide rows	48.3	1.1	49.4	3006
Narrow rows	38.7	1.1	39.8	2588
Gain from wide rows	9.6	0.0	9.6	418

As will be seen from Table 2. there was an apparent gain of over nine bushels to the acre from wide rows.

DEEP VS. SHALLOW CULTIVATION OF CORN.

In this test the land was prepared for planting and the cultivating done on the same dates as in the two previous experiments, in shallow cultivation, the land was worked to a depth of from two to three inches; while with the deep cultivation it was worked to a depth of six to seven inches.

In the following table will be found the yields of corn and fodder on the respective plots.

TABLE III.

YIELD OF CORN AND FODDER PER ACRE FROM DEEP VS. SHALLOW CULTIVATION.

	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder lbs.
Deep cultivation	54.5	1.9	56.4	3241
Shallow cultivation	52.1	1.7	53.8	3125
Gain from deep	2.4	0.2	2.6	226

As will be seen from Table 3, the yield of corn from deep cultivation was less than three bushels in excess of that from the shallow cultivation.

FREQUENT VS. UNFREQUENT CULTIVATIONS OF CORN.

In this experiment the general conditions were similar to those of the other tests. The only difference being that one set of sections received five workings, while the others only received three.

The following table gives the yield of corn and fodder on the respective plots.

TABLE IV.

YIELD OF CORN AND FODDER PER ACRE FROM FREQUENT VS. UNFREQUENT CULTIVATION.

	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder lbs.
Frequent cultivation	47.7	1.6	49.3	3133
Unfrequent cultivation	52.3	1.5	53.8	3341
Gain from Unfrequent cultivation	4.6	—0.1	4.5	208

As shown in Table 4, the yield from unfrequent cultivation was four and a half bushels greater than that from frequent cultivation.

DRILLED VS. CHECKED CORN.

In this test there were two plots used. In the plot planted to drilled corn, the rows were 3 feet 9 inches apart, and the corn one stalk every 18 inches. On the other plot the corn was checked; the rows were laid off 3 feet 9 inches by 4 feet; two stalks were left to the hill. Both drilled and checked corn received five workings.

The following table give the respective yields of Corn and Fodder.

TABLE V.

YIELD OF CORN AND FODDER PER ACRE FROM DRILLED VS. CHECKED CORN.

	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder. lbs.
Drilled	34.8	1.0	35.8	2349
Checked	32.3	0.9	33.2	1824
Gain from drilled	2.5	0.1	2.6	525

As will be seen from Table 5, the drilled corn gave the larger yield by 2.6 bushels to the acre.

CRIMSON CLOVER TESTS WITH CORN.

The land used for this test lies just south of the Station barn. It was in corn in 1894, and at the last working of the corn, July 17th, crimson clover was sown on sections one and three of the plot; while sections two and four were not seeded. On the 31st of May, 1895, the clover was plowed under being then in full head, and the land prepared at once for planting. It was first rubbed, then worked with a cut-a-way harrow so as not to disturb the clover. The plots receiving no clover were plowed and prepared on the same date. On June 1st, the corn was planted on all the plots. The rows were laid off 3 feet 9 inches and corn dropped 18 inches apart in the row, afterwards thinned out to one stalk in a place. The crop was cultivated four times on the following dates: June 7th, June 18th, July 3rd and July 8th.

TABLE VI.

YIELD OF CORN AND FODDER PER ACRE FROM CRIMSON CLOVER VS. NO CLOVER.

	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder lbs.
With crimson clover	45.1	0.9	46.0	2954
No clover	38.9	0.4	39.3	2989
Gain from crimson clover	6.2	0.5	6.7	—35

As will be seen from Table 6, there was an increased yield of 6.7 bushels to the acre on the plots which had crimson clover plowed under.

CORN EXPERIMENTS 1896.

FERTILIZER TEST.

Adjoining the Experiment Station on the south side is the subdivision of College Park, and on part of one of the squares in this division this experiment was conducted. The soil is a light loam easy to cultivate. The last crop grown on the land was wheat, twelve years before, when the yield was less than the seed that was sown. The land had grown up in briars and broom sedge. After cleaning it off it was plowed April 9th, 1896. After preparing the land, fertilizer was applied with a drill on plot one at the rate of 300 lbs. per acre, composed as follows:

Dissolved S. C. rock.....	1200 lbs.
Tankage	500 lbs.
Sulphate of potash.....	300 lbs.

Plot II received no fertilizer.

On May 9th the corn was planted. The rows were 3 feet 9 ins. apart and two grains dropped in the hills every 22 inches, and thinned out to one stalk. The corn was cultivated three times, June 1st, 9th and 19th.

Table 7, gives the yields for this and the two preceding years which the test has made, together with the average yields for the three years.

TABLE VII.

YIELD OF CORN AND FODDER PER ACRE FROM FERTILIZED VS. UNFERTILIZED PLOTS.

Years Tested.	FERTILIZED.				UNFERTILIZED.			
	Merchantable	Unmerchantable	Total	Fodder.	Merchantable	Unmerchantable	Total	Fodder.
	bus.	bus.	bus.	lbs.	bus.	bus.	bus.	lbs.
1894.	39 0	5.4	44.4	1118	31.7	4.6	36 3	1060
1895.	51.9	2.4	54 3	3187	46.4	1.9	48.3	2695
1896.	40.4	3.3	43 7	2105	28 5	2.9	31.4	1931
Average.	43.8	3.7	47.5	2137	35.5	3.1	38.7	1895

As will be seen from Table 7, there has been a decided gain each year from the use of the fertilizer, but only one year out of three, 1896, has the increased yield been sufficient to pay the cost of the fertilizers applied.

WORKNG TESTS.

The land used in these tests is a gravelly loam. It was seeded to grass the fall of 1893 and two crops of hay cut off of it, one in 1894 the other in 1895. The land was ploughed the fall of 1895. After being harrowed early in May, 1896, it was thoroughly worked over with double shovel. On May 5th after being prepared with harrow and rubber, the planting was begun and was finished on May 6th. The same details of planting, cultivation, etc., were observed in the respective tests as described on the previous pages of this bulletin for the season of 1895, no fertilizer was used on any of the plots. All of the plots were cultivated four times, except the unfrequent working which was only cultivated twice on May 27th and June 16th. The other plots in addition to these workings were cultivated on June 4th and 25th. The results of this year's work will be found in the following tables, which give a summary of several years' tests, with the average results obtained by carrying the work through three or four years:

TABLE VIII.

YIELD OF CORN AND FODDER PER ACRE FROM WIDE VS. NARROW ROWS.

Years Tested.	WIDE ROWS.				NARROW ROWS.			
	Merchantable	Unmerchantable	Total	Fodder.	Merchantable	Unmerchantable	Total	Fodder.
	bus.	bus.	bus.	lbs.	bus.	bus.	bus.	lbs.
1894	34 7	4.2	38.9	2280	40 0	5 3	45.3	3485
1895.	48 3	1.1	49.4	3006	38.7	1.1	39.8	2588
1896.	46.2	2 0	48 2	3370	44.8	1 6	46.4	2851
Average.	43.1	2.4	45.5	2885	41.2	2.7	43.9	2975

TABLE IX.

YIELD OF CORN AND FODDER PER ACRE FROM DEEP VS. SHALLOW CULTIVATION.

Years Tested.	DEEP CULTIVATION.				SHALLOW CULTIVATION.			
	Merchantable	Unmerchantable	Total	Fodder.	Merchantable	Unmerchantable	Total	Fodder.
	bus.	bus.	bus.	lbs	bus.	bus.	bus.	lbs.
1893.	27.5	11.5	39.0	3040	34.6	10.1	44.7	3212
1894.	34 2	5 7	39 9	2755	34.5	6.3	40.8	3325
1895.	54.5	1.9	56.4	5241	52 1	1.7	53.8	3125
1896.	56.6	2.1	58.7	3050	46 8	2.4	49 2	3226
Average.	43.2	5 3	48.5	3021	42.0	5.1	47.1	3222

TABLE X.

YIELD OF CORN AND FODDER PER ACRE FROM FREQUENT VS. UNFREQUENT CULTIVATION.

Years Tested.	FREQUENT CULTIVATION.				UNFREQUENT CULTIVATION.			
	Merchantable	Unmerchantable	Total	Fodder.	Merchantable	Unmerchantable	Total	Fodder.
	bus.	bus.	bus.	lbs.	bus.	bus.	bus.	lbs.
1894.	33.0	6.5	39.5	3191	35.7	5.4	41.1	2289
1895	47.7	1.6	49.3	3133	52 3	1.5	53.8	3341
1896.	44.0	1.8	45.8	2898	43.7	2 3	46.0	2804
Average.	41 5	3.3	44 8	3074	43.9	3.1	47.0	2811

TABLE XI.

YIELD OF CORN AND FODDER PER ACRE FROM DRILLED VS. CHECKED CORN.

Years Tested.	DRILLED.				CHECKED.			
	Merchantable	Unmerchantable	Total	Fodder.	Merchantable	Unmerchantable	Total	Fodder.
	bus.	bus.	bus.	lbs	bus.	bus.	bus.	lbs.
1894.	59 3	3.5	62.8	3291	55 9	2.8	58.7	3190
1895.	34.8	1.0	35.8	2349	32.3	0 9	33 2	1824
1896.	48.6	1.2	49.8	2675	41.6	1.2	42.8	1920
Average.	47.5	1.9	49.5	2772	43.2	1.6	44.9	2311

CRIMSON CLOVER PLOWED DOWN FOR CORN.

This experiment was undertaken for the purpose of ascertaining the effect on the yield of corn in growing it on the same land continuously year after year, plowing down crimson clover for each crop. The plot used was the one on which crimson clover was plowed down and a crop of corn grown in 1895; the yield of which was reported in Table 6.

It was the intention when this experiment was undertaken to continue it through a term of years: but owing to the location of the new dairy barn and its attendant yard, it is impossible to keep the drainage from this yard from overflowing on this plot, and it has thereby been unfitted for further tests. In this test the clover was plowed down May 25th, when in full head, the planting and cultivation was similar to that described in the experiment for 1895.

In table XII will be found the yields for the two years. As will be observed instead of the crop of 1896 showing a falling off as compared

to the crop of 1895, as is the usual experience where two crops of corn are grown on the same land two years in succession, there was a decided increase in yield of both corn and fodder the second year.

TABLE XII.

YIELD OF CORN AND FODDER PER ACRE FROM CRIMSON CLOVER PLOWED DOWN TWO SUCCESSIVE YEARS.

Years tested.	Merchantable. bus.	Unmerchantable. bus.	Total. bus.	Fodder. lbs.
1895	45.1	0.9	46.0	2954
1896	48.8	4.6	53.4	3479
Gain for 1896	3.7	.3.7	7.4	525

TESTING DIFFERENT QUANTITIES OF LIME ON CORN.

The above test was made on part of the same square on which the fertilizer test was made the past season. The object of the experiment is to ascertain the most profitable amount of lime to apply per acre on land, taking it through a series of crops; first for corn, followed by wheat, grass, etc. Eight plots were used in the test; two of them, plots 3 and 6, having no lime applied as shown in table XIII. The remaining six having applications ranging from ten to sixty bushels to the acre. The lime was weighed out for each plot and afterwards slacked and applied in a powdered state.

Table XIII gives the yield of the respective plots*

TABLE XIII.

YIED OF CORN PER ACRE FROM DIFFERENT QUANTITIES OF LIME.

Plot No.	Lime Per Acre. bus.	Merchantable bus.	Unmerchantable bus.	Total of bus.
1.	10	19.1	4.8	23 9
2.	20	20.3	5.3	25.6
3.	No lime	11.7	5.7	17.4
4.	30	19.2	6.6	25.8
5.	40	21.3	5.8	27.1
6.	No lime	10.8	4.5	15.3
7.	50	23.2	5.6	28.8
8.	60	24.4	5.4	29.8

*The weights of fodder from these plots could not be gotten because of a high wind which carried the fodder off of all the plots and badly mixed it.

As will be seen the yields are very light, as the land is extremely poor and barren of vegetable matter; but notwithstanding this condition the effect of the lime is very apparent, showing a gain from its use of from 7.5 to 13.4 bushels to the acre. In estimating the profit or loss, as the case may be, in the application of the different amounts of lime on this first crop, it will be seen that only the smallest application, 10

bushels to the acre, was applied to a profit, though a small one. While the larger amounts were applied at a loss ranging from .04 in plot 2 which received 20 bushels of lime to the acre to $4.38 in plot 8 receiving 60 bushels per acre. These estimates are based on corn at 30 cents and lime at 14 cents per bushel, and making no charge for applying the extra quantities of lime, which if done would still further increase the relative loss from the heavy applications. The fact should not be lost sight of however, that this is only the first crop of a series. And that future crops may materially change results: though our experience thus far in the use of lime, justifies recommending the application of from 15 to 20 bushels to the acre, rather than larger amounts.

POTATO EXPERIMENTS 1896.

The experiments made with potatoes the season of 1896 were as follows:

1st. Test of Early Varieties.
2nd. Fertilizer Experiments.
3rd. Early vs. Late Cultivation.
4th. Ridge vs. Level Cultivation.
5th. Deep vs. Shallow Cultivation.
6th. Wide vs. Narrow Rows.

TEST OF EARLY VARIETIES.

The land used for the above experiment was part of that mentioned in this bulletin as having been used for the working tests with corn. As stated it was a two year old sod. With the object of giving the sod an opportunity of rotting, it was plowed November, 1895, with a Jointer plow and remained in this condition until April 14th, when it was harrowed with spring tooth harrow, and afterwards worked over with double shovel plow with long shovels attached; a second harrowing followed by the rubbber put the land in perfect condition for planting. The potatoes were planted April 15th and 16th. The rows were laid off 2 feet 4 inches and the potatoes dropped 16 inches apart in the row. 700 lbs. of fertilizer per acre was applied in the drill. The fertilizer was composed as follows:

1200 lbs. Dissolved S. C. rock.
500 lbs. Tankage.
300 lbs. Potash.

41 varieties were planted. Every sixth plot was planted to Holton Rose as a check plot. The potatoes were cultivated three times on the following dates: May 15th, May 30th and June 11th. Plots 3 and 5 were planted with northern grown seed, the Acme Seedling and Early Harvest, respectively; and plots 2 and 4 with home grown seed of the same varieties. All of the varieties came up well and grew well up to a short time before ripening, when they were suddenly and severely attacked with the blight, and as a result the vines of all the varieties died within a few days of each other. As a consequence no reliable data could be gotten as to comparative earliness of the different varieties.

Table XIV gives the yield of the different varieties.

TABLE XIV.

Varieties of Potatoes Tested and Yields Per Acre.—1896.

Plot No.	Name of Variety.	Merchantable.	Unmerchantable.	Total.
		bus.	bus.	bus.
1	Early Maine	134.4	16.7	151.1
2	Acme Seedling (Home Grown)	92.2	14.5	106.7
3	Acme Seedling (Northern Grown)	93 3	11.1	104 4
4	Early Harvest (Home Grown)	96.7	22.2	118.9
5	Early Harvest (Northern Grown)	102 2	15.0	117.2
6	Holton Rose	168 3	22.1	190.4
7	Early Cyclone	118 9	17 8	136.7
8	Van-Guard	137.8	21 1	158 9
9	Sunlight Star	123.3	20 0	143.3
10	Thorburn	127 8	16.7	144.5
11	Irish Cobbler	142.2	11.7	153.9
12	Holton Rose	166.1	21.0	187.1
13	Pearl of Savoy	121.1	22.8	143.9
14	Chas. Downing	106 7	7.8	114.5
15	Lightening Express	115.6	7.8	123.4
16	Early Vaughn	57 8	8 9	66.7
17	Early Ohio	108 9	11 1	120.0
18	Holton Rose	146 1	15.5	161.6
19	Early Puritan	120.0	18 9	138.9
20	Early Norther	108.9	21.1	130 0
21	Beauty Hebron	100.0	16.7	116 7
22	Minister	111.7	20.0	131.7
23	Lee's Favorite	128.9	23.3	152.2
24	Holton Rose	170.5	15.5	186.0
25	Early Fortune	102.2	11.1	113.3
26	Early Michigan	120.0	11.1	131.1
27	Thoroughbred	136.7	12.0	148.7
28	Milwaukee	141.1	13 4	154.5
29	Early Rose	124 4	11.1	135 5
30	Holton Rose	157.2	17.7	174.9
31	Garfield	131.1	14.5	145 6
32	Carman No. 1	138 9	10 0	148 9
33	King of Roses	122.2	13.9	136.1
34	Salzer's Earliest	131.1	16.7	147.8
35	Dreer's Standard	94 5	14 4	108 9
36	Holton Rose	148.3	13.3	161 6
37	Early Wisconsin	92 2	13.9	106.1
38	Arizona	126.7	17.8	144.5
39	Handen Beauty	126 7	11 1	137.8
40	Tonhocks	122 2	16.7	138.9
41	Wisconsin Beauty	105.6	11.1	116.7
42	Holton Rose	130 6	14 4	145.0
43	Early Market	77 8	7.8	85.6
44	Polaris	95.6	10 0	105 6
45	Early Sunrise	132.2	12.2	144 4
46	New Queen	95 6	26 1	121.7
47	Summit	138 9	18 9	157.8
48	Holton Rose	159 4	13 3	172 7
49	Lee's Favorite	122.8	13 3	136.1
50	Crown Jewel	140.0	26.7	166 7

It will be observed from Table XIV there was a very slight difference in yield of the Northern and home grown seed; the difference being in favor of the Northern grown seed in both cases.

FERTILIZER TEST.

This experiment was conducted on part of the square on which the lime and fertilizer tests with corn were made. It was plowed April 18th. The preparation of the land was similar to that of the variety tests. The potatoes were planted April 27th and the fertilizer sowed by hand in the row before planting. One row was planted between each plot without any fertilizer, so that the potatoes of one plot might not receive any benefit from the fertilizer from adjoining plots.

TABLE XV.

YIELD OF POTATOES ON FERTILIZER PLOTS.

In bushels per acre.

Plot No.	Kind of Fertilizer.	Pounds of Fertilizer per Acre.	Merchantable Potatoes per Acre.	Unmerchantable Potatoes per Acre.	Total Yield.
		Lbs.	Bus.	Bus.	Bus.
1.	Dissolved S. C. Rock.....	400	21.9	9 4	31 3
2.	Dissolved S. C. Rock.....	600	27.1	12.0	39.1
3.	Dissolved S. C. Rock..... 400 Muriate of Potash..... 150	550	24 0	8.3	32 3
4.	Dissolved S. C. Rock..... 400 Sulphate of Potash..... 150	550	32.3	7.8	40.1
5.	Nothing.....	.....	18.7	8.3	27.0
6.	Dissolved S. C. Rock..... 400 Kainit..... 600	1000	20.8	9.4	30.2
7.	Dissolved S. C. Rock..... 400 Dried Blood..... 150	550	60.4	12.5	72.9
8.	Dissolved S. C. Rock..... 400 Dried Blood..... 75 Nitrate of Soda..... 75	550	62.5	12.5	75 0
9.	Dissolved S. C. Rock..... 400 Dried Blood..... 75 Nitrate of Soda ..... 75 Muriate of Potash 150	700	59.3	19 8	79.1
10.	Dissolved S. C. Rock..... 400 Dried Blood..... 75 Nitrate of Soda..... 75 Sulphate of Potash..... .. 150	700	68.7	17.8	86.5

This experiment was planned as will be seen from an examination of the program with the idea of testing the following points:

1st. The efficiency of different quantities of phosphoric acid when applied alone.

2nd. Comparing kainit, muriate of potash and sulphate of potash for potatoes.

3rd. Supplying all the nitrogen in the organic form; and supplying one half in the organic form by blood and one half in the soluble mineral form by nitrate of soda.

4th. Comparing "Complete" and "Incomplete" commercial fertilizers.

The season was very dry, which together with the blight, caused the growing period to be cut short and consequently the yields were small in all cases.

RESULTS.

1st. Phosphoric acid. As will be seen from the table there was 50 per cent. more phosphoric acid applied to plot 2 than to plot 1. Both these applications gave an increased yield over the nothing plots, and the larger application gave really more than its corresponding increase and sufficient to warrant the extra amount applied.

2nd. Potash. From an examination of the results on plots Nos. 3, 4, 6, 9, and 10, it will be seen that the sulphate of potash gave the best results, muriate the next, and that kainit was not well adapted to potatoes on this soil and under the conditions which surrounded this test. The vines where sulphate of potash was applied were a much darker green and a better color than where muriate and kainit were used.

3rd. Nitrogen. The nitrogenous fertilizers evidently had the most marked effect in increasing the yield. Their effect was very noticeable during the growing season in causing the vines to have a rich dark green color superior to all other plots to which no nitrogen was applied; Nitrate of soda giving better results than the dried blood. On lands of the general character of that used in this experiment and on all land so void of organic matter, it is very evident that fertilizers to be used on them should contain considerable nitrogen.

4th. In this test the "Complete" fertilizer gave much better results than any of the "Incomplete" or single ingredients, and shows the necessity for having all the essential plant foods in a fertilizer to be used on soils similar to that used in these experiments.

TESTING DIFFERENT MODES OF CULTIVATION.

The first 3 working tests, early vs. late cultivation, deep vs. shallow, and ridge vs. level, were conducted on one of our half acre plots, known as No. 1. The test of wide vs. narrow rows was made on plot No. 3. Plot No. 1 had been in sod for three years; plot No. 3 for one year. The plots were plowed the 19th and 20th of November. April 16th, 1896, they were

prepared for planting, as described in former tests. Fertilizer at the rate of 700 lbs. per acre was applied in the drill, composed as follows:

Dissolved S. C. rock.....	1200 lbs.
Tankage	500 lbs.
Sulphate of potash.....	300 lbs.

In each of the tests except the one of wide and narrow rows, the rows were run two and a half feet apart, and the potatoes were dropped 14 inches apart in the row. The potatoes were all cultivated three times on the following dates: May 25th, June 5th and June 12th. In each of the tests there were four sections used, which were separated in each case by a row of potatoes which was cut out of the experiment.

EARLY VS. LATE CULTIVATION.

As was stated in bulletin 38, March, 1896, the object of this test is to ascertain how late it pays to work potatoes. The potatoes on all four of the sections received the three first workings: May 25th, June 5th and June 12th. Those on two of the plots received an additional working June 24th.

In the following table will be found the respective yields for the years which the test has been made, and the average yield for three years:

TABLE XVI.

YIELD OF POTATOES FROM EARLY AND LATE CULTIVATION.

In bushels per acre.

Years Tested.	EARLY CULTIVATION.			LATE CULTIVATION.		
	Merchantable	Unmerchantable	Total.	Merchantable	Unmerchantable	Total
	bus.	bus.	bus.	bus.	bus.	bus.
1894.	96.6	18.0	114.6	96.5	20.0	116.5
1895.	78.1	13.1	91.2	68.4	13.6	82.0
1896.	78.9	15.4	94.3	78.9	11.4	89.3
Average...	84.5	15.5	1000	81.3	150	95.9

As will be seen from Table 16, early and late cultivation the past season gave identically the same yield of merchantable potatoes, though the early cultivation gave a slightly increased yield of small potatoes. Taking the average for the three years which the test has been made, the early cultivation has given rather better yields.

RIDGE VS. LEVEL CULTIVATION.

In this test the cultivation of all the sections was alike in every respect until the last working, at which time the rows in two of the sec-

tions instead of being worked with the cultivator were ridged by running down the middle of each row a single shovel plow with broad shovel attached.

In table 17 will be found the yields for this and the three preceding years which the test has been made, and the average yield for four years.

TABLE XVII.

Yield of Potatoes from Ridge and Level Cultivation.

In bushels per acre.

Years Tested.	Ridge Culture.			Level Culture.		
	Merchantable	Unmerchantable	Total	Merchantable	Unmerchantable	Total
	bus.	bus.	bus.	bus.	bus.	bus.
1893.	71.7	24 1	95 8	72.8	21.3	94.1
1894.	77 8	17 9	95.7	69.6	21.7	91.3
1895.	64 7	14.6	79.3	73 1	8.7	81.8
1896.	92.2	13 9	106.2	85 0	12.3	97.3
Average....	76.6	17.6	94.2	74.4	16.0	91.1

As will be seen from Table 17, ridge cultivation has given slightly better yields each of the four years which the test has been made, the average gain for the four years being 3.1 bushels to the acre.

DEEP VS. SHALLOW CULTIVATION.

In this test two of the sections were cultivated to a depth not to exceed two to two and a half inches; while the other two sections were worked to a depth of from five to six inches.

In table 18 will be found the respective yields for the three years which the test has been made, and the average yield for three years.

TABLE XVIII.

Yield of Potatoes from Deep and Shallow Cultivation.

In bushels per Acre.

Years Tested.	Deep Cultivation.			Shallow Cultivation.		
	Merchantable	Unmerchantable.	Total.	Merchantable	Unmerchantable.	Total.
	bus.	bus.	bus.	bus.	bus.	bus.
1894.	72 0	18.1	90.1	67.7	20.9	88.6
1895.	85.2	15.9	101.1	87.0	15.1	102.1
1896.	12.50	12.3	137.3	130.7	9.5	140.2
Average....	94.1	15.4	109.5	95.1	15.1	110.3

As will be seen from Table 18 the greatest difference in yield for any one of the three years which the test of Deep and Shallow Cultivation has been made, has been less than three bushels to the acre, while the average difference for the three years has been less than one bushel to the acre.

WIDE VS. NARROW ROWS.

In this test the rows in two of the sections were run out 2½ feet apart and the potatoes dropped 14 inches in the row. In the other two sections the rows were run out three feet wide and cuttings 12 inches apart in the row; there being about the same number of cuttings planted to the acre in each case.

Table 19 gives the yields for the three years which the test has been made, and the average yields for three years.

TABLE XIX.

YIELD OF POTATOES FROM WIDE AND NARROW ROWS.

In bushels per acre.

Years Tested	WIDE ROWS.			NARROW ROWS.		
	Merchantable	Unmerchantable	Total	Merchantable	Unmerchantable	Total
	bus.	bus.	bus.	bus.	bus.	bus.
1894	67.1	17.9	85 0	86.0	21.0	107.0
1895	67.5	8.9	76 4	79.5	12.8	92 3
1896.	63 3	11 3	74 6	89 3	12.9	102.2
Average ...	65 9	12 7	78.7	84 9	15.6	100.5

As will be seen from Table 17, narrow rows have given the larger yield each of the three years which the test has been made, and taking an average of the 3 years the gain for narrow rows has amounted to 21.8 bushels to the acre.

MARYLAND

Agricultural Experiment Station.

BULLETIN NO. 47.

DAIRY FARMING.

COLLEGE PARK, MD.

JUNE, 1897.

MARYLAND

Agricultural Experiment Station.

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NOTICE.

The bulletins of the Station will be mailed free to any citizen of Maryland who sends his name and address to the Station for that purpose.

Correspondents will please notify the Director of changes in their post-office address, or any failure to receive the bulletins.

ADDRESS,

MARYLAND AGRICULTURAL EXPERIMENT STATION,

COLLEGE PARK, MD.

The matter contained in this bulletin was prepared for and read at a convention of farmers in Montgomery County of this State during the past winter. Many of those who were in attendance are engaged in dairying, and being much interested in the paper, they expressed a desire, by unanimous vote, that it be issued as a bulletin from this Station, thereby making it available for future reference for those present, and at the same time giving those in other sections of the State, who are also interested in dairying, an opportunity of being benefited by the many valuable suggestions contained therein. As this suggestion coincided with my own views in the matter, I deem it proper, with the consent of the author and with this explanation, to issue it as one of the regular bulletins of the Station.

ROBT H. MILLER,

Director.

DAIRY FARMING.

By H. J. Patterson, Chemist.

With the changed condition which confronts most Eastern farmers, it is very natural to find many holding under advisement new systems of farming and modifications of the old systems. Some whose land and location would permit, have successfully turned their attention to fruits and vegetables; but to the majority, this class of farming is out of the question, and to many of such the dairy has appealed as being probably the best adapted to their needs; permitting them to continue raising crops which are suited to their soils; and converting so-called staple crops into products which are more easily and cheaply marketed, which will not have the same competition. It is to those who have already adopted dairying or are considering it that I have been asked to say a few words upon this occasion. Most all are dissatisfied with the results attending the old time methods and they do not want to turn into a new road unless there is a reasonable promise of success. To all such it may be well to say in starting out, that success in dairy farming depends really upon three facts:—The man, The cow and The feed.

THE MAN: One thing more than any other that causes agriculture to occupy the place it does to-day is the men who are following it. We find in the ranks everwhere a considerable number who are following agrieulture, either because they have had no opportunity to enter any other pursuit or because they have made a failure in other pursuits. There is the fallacious idea in the minds of many that if a man can do nothing else he had better go to farming. Whereas, the truth is, that there is no profession or business in which a wider range of knowledge can be applied, or that requires better business methods. This is certainly true in dairy farming. We cannot expect every man to make a sueeessful dairyman any more than we ean expeet every one to make a successful lawyer or merchant; nor can we expect every man who has been a sueeessful general farmer to make a suecess of dairying. Dairying has as many peculiarities of its own as has green house management, only they are of a different character. Dairying is a business that requires constant and regular attention. It means being at a given place and doing a particular thing at least twice each day and 365 days in a year. It has no Sundays and no holidays. Consequently, the man who engages in dairying should be one who is seeking eonstant employment and of the most regular kind. The dairyman should have a mild and even temperament; should be a lover of animals and a keen observer of their individualities and idiosyncrasies, should have a full appreciation of the importanee of the word "Now," and crowning all should possess an unusual de-

grec of sensibility of cleanliness and neatness. There are some who ae born dairymen; others acquire it, and the latter will require a higher degree of intelligence than the former.

A good dairyman can take entire care of at least 25 cows and the accumulating young stock from same, or give an equivalent amount of labor. Of course to do this will require that all the stable arrangements shall be of the most convenient sort. Such a man can be procured at from $30.00 to $40.00 per month and house, which will make the attention cost about $17.00 per cow per annum.

THE COW: The cow is the foundation of the whole dairy business. Success depends more on the herd than any other one point. Much of course depends upon the feed and care, but the best of feed and care will not make a poor cow a good one or will not bring a cow with a capacity of 2000 lbs. of milk or 100 lbs. of butter up to 6000 lbs. of milk or 300 lbs. of butter annually.

In selecting a dairy herd it is not my purpose to advise any particular breed, only let it be special dairy animals and not general purpose ones, and in this connection I would say that good dairy animals do not necessarily mean fancy bred stock; yet I would not say a word against pedigreed stock as it is essential and has its place; but at the same time in buying pure bred cows insist on getting more than pedigree. Pedigree is of value and should be well studied as it is the basis on which to calculate as to the quality of the calves and the cows they will make; but have it supported by individual merit. Buy a cow that has performance or the desired marks of a good cow and then have the pedigree thrown in rather than buy the pedigree and have any sort of a cow thrown in. The progressive dairymen want a cow whose temperament and functions are for milk or butter, and the problem confronting hundreds of dairymen and those about to enter upon dairy husbandry, is how to economically obtain these desired qualities in a herd.

What I have to say in this connection is more applicable to the butter herd than to the herd from which the milk is sold as milk, as some figures which I shall give you later will indicate; yet it has more or less application for all.

Those who are at present engaged in dairying will find, undoubtedly, upon investigation that they have some good and profitable dairy animals in their herds, but at the same time they will find that the majority are not what they should be, and some are not only absolutely worthless, but are in your debt for their keep. To such dairymen I would say adopt at once some plan of improvement and the only rational plan is to open an account with each cow. This is the first place where real business principles of the highest order should be adopted in the dairy. None of you would for instance, pay regularly one dollar to a man who had ability to perform only ten cents worth of labor; or keep a horse who was able to perform less work than the value of the hay he would annually consume, but that is just what many are practicing with cows. In a general way you know what each cow costs for feed and attendance. Now then know exactly what each cow gives in return. This information can only be obtained by keeping a record of the milk each cow gives, and if that milk is

made into butter, know the amount of butter she makes. This data can be obtained by weighing daily the milk of each cow and for the butter factor make a Babcock test every month (using a composit sample for at least five days) of the milk of each cow. This is a little more labor than usual, of course, but not nearly as much as it takes for the merchant to keep his books. With this data at hand it is a small matter to determine which cows have been kept at a profit and which at a loss. Then as soon as this information is obtained dispose of every cow that has not contributed to the profits.

To those who are about starting a dairy I should advise buying the best natives and grades obtainable and buy them by test and open up an account with each cow as soon as purchased.

You can afford to pay much more for a cow that will make 300 lbs. of butter than you can for one making 200 lbs.; in fact, under ordinary conditions the former will make enough butter to give a profit on her keep and the latter will require more expended on her than she gives in return.

To all who are interested in the dairy at all, whether it be few or many cows, the only way to improve your herd and be reasonbly sure you will get what you are after, is to select carefully, weed out, and breed and raise a herd. This can only be done by using a good male, from well-known milk and butter strains, upon your best cows and raising the females. This is the place to invest your money in high bred pedigreed stock. Never on any account breed from a cross bred or scrub bull.

Dairymen cannot expect to find what they want on the market or get the best cows by purchasing them, for it is exceptional for a man to sell a good cow, and the more advanced a community becomes in dairying, keeping records and making tests of their cows, the harder will it be to secure a good cow by purchase.

To illustrate more thoroughly the way the average dairy is conducted and the quality of the animals in them, I will give the record of a herd of eleven cows selected from among the farmers in Montgomery Co., (Sandy Spring and vicinity,) and which at least represent the average herd in this community, and I venture to say, after having the opinion of a considerable number of dairymen, is rather above than below the average herd. This herd has been well fed and cared for.

The following table shows the milk, cream and butter given by each cow, and the value of the respective products when sold. Milk is estimamated at 2 cents per pound, about 4 cents per quart; cream at 8 cents per pound or about 65 cents per gallon, and butter at 20 cents per pound. All should be able to obtain as high prices as these, and many can obtain much more.

TABLE I.—MILK, CREAM AND BUTTER YIELDS AND VALUES OF SAME OF STATION HERD FOR 1896.

Cow No.	Produced.			Value of Product if sold as		
	Milk.	Cream.	Butter.	Milk at 4c. per qt.	Cream at 65c. per gl.	Butter at 20c. per lb.
1	3805.	761	261 34	$ 76.10	60.88	52 20
2	3392.5	678	185.41	67.85	54 24	37.08
3	4104.	821	165.64	81.08	65 86	33.12
4	2919.	584	109.48	58 38	46.72	21.89
5	4890	978	219.25	97 80	78.24	43.85
6	3613 5	723	227.74	72.27	57.84	45.55
7	4965 5	993	285.79	99.31	79.44	57.15
8	5320.	1064	303.08	106.40	85.12	60.62
9	5423.	1085	279.87	108 43	86.80	55.97
10	5653.5	1131	242 96	113.07	90.48	48.59
11	4535.5	907	248.44	90 71	72.56	49.69

The feed for these cows, as will be shown later, cost approximately $31.00 per cow; this with $17.00 for attention makes the annual keep of each cow $48.00.

An examination of the value columns shows that when the product was sold as milk that all of the cows yielded a profit, and in most instances a very handsome profit. Had the product been sold as cream, one cow (No. 4) would have found herself slightly in debt for her keep, and had the product been made into butter, selling at 20 cents per pound, five of the eleven cows would have proven to be unprofitable. The cost of keep ranging in excess of the returns from $2.45 to $26.11 per annum. The profits from the six cows range from 41 cents to $11.38.

These figures illustrate what is going on in every herd in the country. In some to a less extent, but in the majority of instances the percentage of unprofitable animals is much greater than the above table would indicate.

In these calculations no account has been taken, from the fact that it would make the figures too complicated for our present purposes, of the value of manure, or of the calves from the cows, or of the skim milk from the cream or butter; but all these would contribute to the profits of dairy farming, and I believe if properly managed that these factors can be made to give almost as good returns as the direct product.

From what has been said and illustrations given in the table, it should be evident to all that there is much more in the individuality of the animal than is credited to her by ordinary dairymen, and that it is desirable on the part of all to pay more attention to selection and breeding up dairy herds. Especially is this applicable to those who are going to practice dairy farming in a section, where most of the products must be disposed of as cream or butter.

From the figures in the tables we can well understand how dairymen near cities who sell milk generally at retail at from 6 to 10 cents

per quart can afford to practice buying cows in the open market and depend on any kind of a cow they happen to get; for we see that it is a very poor cow that does not pay at least a small profit, and that the ordinary cow will pay handsomely for her keep. The poorest cow in the herd of eleven would have given a profit of nearly forty dollars to a dairyman selling milk at 6 cents per quart.

So we can sum up that the principles and practices for cream and butter producers are different from those of the milk producer, and that the former cannot look to the latter for advice or follow in his footsteps in the matter of the selection or management of the herd, for often in so doing instead of being on the road to success ruin will be the terminus. The following verses in the "Rural New Yorker" contain much truth applicable to those keeping cows, such as No. 4, in the above table, in cream and butter herds, and may serve to impress some more than figures will.

The scrub cow is supposed to say:

"If I should die to-night—
"Then would you look upon my quiet face
"And wish me back within my stall?
"Would the many years of eating I have spent
"Devouring all your hard-earned grain and hay,
"With scant return in butter, milk, or cream,
"With little save a pile of leached-out dung
"And my society to leave behind—
"Would such a life-work make you wish me back,
"If I should die to-night?"

To which the farmer replies:

"If you should die to-night—
"I'd be ten dollars better off by spring.
"That money represents the difference
"Between the food that you would swallow down
"Before the snow melts and the milk and cream
"That you could manufacture from the food.
"If you should die to-night—I'd thank my stars.
"And if you think of dying, let me take
"My ax and turn you into beef, at least,
"Before you die to-night."

FEEDING COWS.

After procuring good cows the next point is to feed them properly. This in short means plenty of good nutritious food and water. By nutritious food I mean such as is well adapted to milk production and keeping the animals in a perfectly healthy condition.

After a thorough understanding of the principles of feeding, the question is how to obtain the desired feeds or ones which will make combinations furnishing the desired qualities economically.

Under the present system of farming and by the practice of pasturing cows, it requires on the average about four acres per cow per annum, with the most approved system, the dairyman should carry at least one for each acre or in other words should devote but a single acre to a cow. This may seem to some only a theoretical statement, but I have often been told by dairymen they were doing exactly this thing, and have even been told by some dairymen that they were doing much better than a cow to the acre. One instance which came to my attention a few days ago, was a dairyman who was keeping 90 cows on 40 acres, and his herd averaged last year over 6000 lbs. of milk per cow. This goal in dairying can only be attained through the use of a combination of the soiling system and the silo.

Lands which are especially farmed for soiling crops can be made to yield enormously. By a proper management of the soiling system, it is possible to have plenty of green succulent food for cows at least seven to eight months in the year in this latitude.

The crops which I would suggest as well adapted for this purpose are in order of time of use, beginning in spring: Rye, Crimson Clover, Red Clover and Mixed Grasses, Corn, and then winding up the season with early seeded Crimson Clover and Rye. In some sections Kale will come earlier than rye and also can be used late in the fall or early winter.

The silo is an invaluable accompaniment of dairy farming, from the fact that it admits of putting a corn crop in a shape to be used economically by cattle and will furnish the cows a succulent food in the winter season or even help over a severe drought in summer. Silage will act as an appetizer to cows and keep the digestive system in good condition.

In the use of silage it is necessary to keep in mind the fact that milk needs to be handled with greater care than when dry food is used, as the odors from silage are quickly absorbed by milk and will cause milk and butter to have a disagreeable odor and sometimes taste. Consequently, I would advise silage being fed in the open air or in a separate building from that in which the milking is done. On no account have the silo opening into the milking stable. Silage should only be fed in moderate quantities, and I should not approve on any account exclusive feeding of silage as sometimes practiced. When fed in moderate quantities it causes the cows to have a good appetite and keeps the digestive organs in good condition, which will show in the quality of product.

The corn plant is the best adapted for making silage of and to use this crop most advantageously and economically, grow it as though you were growing the crop for the grain. Then cut and put in the silo when the grains are beginning to glaze.

So far, only the long feed for the cows has been considered, but successful feeding means a grain ration in addition. With most farmers the matter of compounding a grain ration which will make up the deficiency of the fodder ration and make the whole well balanced, and one well adapted for milk production is a difficult problem. This is the prob-

lem which is little understood, and consequently very generally overlooked.

In making proper grain rations it will usually be found more economical to purchase some of the cheap by-products rather than depend on balancing the ration with grains which can be raised on our farms, and when it comes to purchasing feeds, purchase them in car load lots so as to get bottom prices. If no one person feels justified in buying a car load, two or three in the same community certainly can combine to to that extent at least. The minimum car load of feed is 12 tons and the maximum 20 tons.

We have either purchased or had quoted to us at the Experiment Station this year feeds at the following prices, by the car load, delivered at College Station. The feeds are in sacks which are worth five cents each or on the average at least $1.00 worth of sacks with each ton.

Hominy chop	$11.00 per ton.
Wheat bran	11.00 per ton.
Linseed meal	16.50 per ton
Cream gluten meal	13.50 per ton.
Cotton seed meal	17.00 per ton.

The hominy crop will take the place in the ration of corn meal though a little richer. To these prices I have placed in the estimates of the cost of rations which I give later the following values upon some of our fodders:

Cut and shredded fodder	$ 5.00 per ton.
Silage	1.00 per ton.
Clover hay	10.00 per ton.
Mixed hay	12.00 per ton.
Corn and cob meal	10.00 per ton.

The following are examples of some grain rations which may be used.

No. 1—Grain Mixture.

Hominy chop	500 lbs.
Wheat bran	300 lbs.
Gluten meal	100 lbs.
Linseed meal	100 lbs.
	1000

To an average cow fed 10 or 12 lbs. per day of the above grain mixture and all the cut corn fodder she will eat, which will be about 10 lbs. per day, such a ration will have a nutritive ratio* of 1 to 6.6 and cost 8½ to 10 cents per day for each cow.

*Roughly speaking, nutritive ratio means that the ration will have 1 pound of digestible albuminoids to each 6.6 lbs. of digestible starch and sugar.

If instead of feeding fodder alone you were to substitute half the fodder by 20 lbs. of silage per day, the cost of the ration would be reduced and have a nutritive ratio of 1.7. The same grain ration with mixed hay would have a nutritive ratio of 1: 6.3, but would cost about 2 cents more per day.

No. 2.—Grain Mixture.

Hominy chop	400 lbs.
Wheat bran	600 lbs.
	1000

Such a grain mixture would cost about 5½ cts. per day for an average cow eating 10 lbs. per day, and would go well with a fodder ration of 20 lbs. corn silage and 5 lbs. clover hay per day per cow.

No. 3.—Grain Mixture.

Corn and cob meal	600 lbs.
Gluten meal	400 lbs.
	1000

This grain ration would cost 5¾ cents per day and could be fed with a fodder ration of 10 lbs. cut corn fodder per day. Such a ration would have a nutritive ratio of 1:6.3.

No. 4.—Grain Mixture.

Corn and cob meal	400 lbs.
Wheat bran	400 lbs.
Cotton seed meal	200 lbs.
	1000

10 lbs. of this and 10 lbs. of cut fodder per day will make a good ration for an average cow and will give a nutritive ratio of 1:6.3 and cost 8 ½ cts. per day per cow.

No. 5.—Grain Mixture.

Corn meal	400 lbs.
Wheat bran	300 lbs.
Linseed meal	300 lbs.
	1000

A cow weighing 700 to 900 lbs would require 10 to 12 lbs. per day

of the grain mixture with 6 lbs. of cut corn fodder and 20 lbs. of silage per day. Such a ration would have a untritive ratio of 1:5.5.

These few rations will give an idea of what rations are and how they are made up, but may not be applicable to any individual case. The selection of the by-product will vary from time to time with the market and should be chosen with reference to cheapness, other things being equal.

The prices fixed on the home products are about as much as can be realized at present market prices, so feeding them to cows would afford a home market for things that cannot be disposed of easily if at all.

A ration, such as grain mixture No. 1, with cut corn fodder would make a year's feed cost about $31.00 per cow, and this is the basis used in the discussion of the profits and losses in table 1.

In practice many will find that they can feed cows cheaper than this where soiling crops are used a good portion of the year, but it was not deemed advisable to consider any lower figures in this presentation of the subject as beginners could not calculate on starting off on any cheaper basis.

These considerations show that many a farmer may be able with good cows and good methods to go into dairying and make good wages for himself, have a profitable market for crops which are now unprofitable, and also improve his farm, and on the whole make the farm pay which, under the present system is going behind financially.

THE ADVANTAGES AND OBSTACLES CONFRONTING THE FARMERS OF CENTRAL MARYLAND, IN EMBARKING IN THE CREAMERY BUSINESS: There are many advantages which this section offers for the creamery which are not shared by those in the far West, but at the same time we have disadvantages.

In starting an enterprise of this character in this locality, the first thing to decide upon, is that the quality of the product to be turned out is to be first-class and superior to what is generally on the market. The aim should be to supply special and fancy markets and not be placed in competition with ordinary or even Elgin products, if butter is to be made. In the summer season when a creamery is likely to get the most milk and the price of butter is lowest and special markets in this locality taking the least, our location offers many opportunities for disposing of cream; also of making a portion of the cream into ice cream, which creameries far from the cities cannot reach (and when I say ice cream I mean a fancy article and not ordinary.) It is only by means of making the best use of such advantages and side issues that in my opinion a creamery can be made successful for this community, as otherwise the disadvantages which I shall enumerate will cut the profits down to too small a margin with the limited amount of product that can be turned out.

The principal disadvantages which we encounter are in the quality of animals at our disposal and the limited supply of good and cheap food on most farms. The pastures of the farms are too full of weeds and garlic which are detrimental to a good quality of milk and butter. These are

disadvantages of course which time and care can overcome but they exist with us and would have to be encountered at the start.

In the dairy business, as with all industries, there is always room for first class products and whenever and wherever they are produced they will be sought after and bring success to the community that produces them.

Again I wish to suggest one thing for consideration in connection with dairy farming, and that is that though it may not seem expedient to establish a creamery for the production of butter, would it not be well for a community like this to start a milk and cream business modeled after the best points in the plans of the Abbots of Philadelphia and the Copenhagen market of Denmark. I believe it could be made profitable and that there is no time so ripe for it as the present when our daily papers of Washington and Baltimore are saying so much about poor quality and impure milk.

ESTABLISHING CO-OPERATIVE CREAMERIES:—The first requisite in locating a creamery is that there should be a sufficient number of cows in a radius of 3 or 4 miles to justify the venture. The greater the quantity of milk the more economical it is to run a creamery, and as a rule the better are the returns. A creamery in starting ought to have a guarantee of at least 300 or 400 cows and better 500, but should there not be a sufficient number of cows near the creamery this can be helped out by putting in a small plant at the churning station, and then have one or more small skimming stations where the milk of several farms is separated and only the cream taken to the creamery. Even the skimming station system might be modified by the use of the hand separaters on the several farms which would only necessitate hauling the cream to the creamery, and thus do away with the great expense attending the system of hauling whole milk and skim milk back home again. If each farmer should separate his own cream it would necessitate greater care and the methods and operation should be supervised and carried on under the direction of the creamery management.

Next in importance to a sufficient number of cows is the organization. The creamery patrons should have all the profits there is in the business, and the only way to secure this is to organize on the co-operative plan and give each patron an equal voice in the management. After you have decided to organize a creamery and have formulated your plans of organization in detail, then appoint a building and equipping committee, and see that it is composed of the right kind of men and leave the details to them. The committee should visit some well equipped and successful creamery, then make up their plans of building and list of apparatus and receive bids from several responsible builders and supply houses for furnishing what is wanted. On no account take the advice of agents who would persuade you to put up a larger and more expensive building than is necessary, and put the company in debt to start with. For organizing, etc., secure some of the printed forms of articles and agreements, by-laws, etc., and then modify them to suit your conditions.

In order to run a creamery successfully it would generally be better for the officers to be milk producers, and receive no pay for their services except what comes from their own dairies. The manager, of course, is an exception, as he will be required to give a considerable portion of his time, he should be selected with the greatest care, as success lies largely with him. After getting a plant ready for operation procure a first-class butter-maker. The butter-maker should be a man who understands thoroughly all operations, and should keep posted on the latest and best process; he should have tact in getting along with the different patrons, and should be able to instruct patrons and persuade them to adopt good methods.

PRICE PAID FOR MILK:—The amount which the creamery can afford to pay for milk will depend upon the quality of the milk and the price received for the butter made. The cost of producing milk and the price at which the patron can afford to sell it for will depend upon the quality of the cows and the price of feed. With the character of the herd indicated in the table on page 77, and the amount of butter made the returns for the milk would be about 92 cents per hundred. This amount, of course, would only give a profit with the best cows, and would give the same loss with the poor ones, as has been already cited. In order to make a herd like this average one, pay for their keep and attention, it would be necessary to receive $1.12 per hundred for the milk, or 20 cents per hundred more than 20 cent butter would allow. From these prices the cost of running the creamery and expenses attending sale of product, &c., would have to be deducted.

In purchasing milk at a creamery it should be paid for acording to its fat content, and no patron should be satisfied with any other system, as by this method each patron gets what he delivers, no more and no less, and no one is being done an injustice, which is the case if the same price is paid for all the milk regardless of quality.

In this connection I wish to say one more word to those who are engaged in dairying, and that is to pay more attention to keeping abreast of the times in your business, and never get the idea that you know all there is to know about it, for falling into this rut has brought failure to many a man. The only way to keep up with the most modern thought in dairying is to read a live paper or journal specially devoted to dairying, and in addition any other literature you may be able to procure. One little book I would advise being in every dairyman's hands is "American Dairying," by H. B. Gurler, costing $1.00. There are a number of good dairy papers, but none so well adapted to all phases of the dairy business as "Hoard's Dairyman," which is a weekly, costing $1.00 per year. Appended herewith is a list of valuable dairy books and papers, and the progressive dairyman should have as many of them as he can afford and his time and inclination will permit him to use.

BOOKS.

American Dairyman, by H. B. Gurler.....$1.00
Milk and Its Products, by H. H. Wing..... 1.00

The Principles of Modern Dairy Practice, by Grotenfelt, translated by Woll..... 2.00
The Chemistry of Dairying, by H. Snyder..... 1.50
Milk—Its Nature and Composition, by C. M. Aikman..... 1.00
Pasteurization and Sterilization of Milk, by Monrad..... 50
Dairy Bacteriology, by Russel..... 2.00

DAIRY JOURNALS.

American Cheesemaker, Grand Rapids, Mich., monthly..... 50
American Creamery, New York City, weekly..... 1.00
American Dairyman, New Yory City, weekly..... 1.50
Chicago Produce, Chicago, Ill., weekly..... 1.00
Creamery Gazette, Des Moines, Ia., weekly..... 1.00
Creamery Journal, Waterloo, Ia., monthly..... 1.00
Dairy World, Chicago, Ill., monthly..... 1.00
Elgin Dairy Report, Elgin Ill., weekly..... 1.00
Hoard's Dairyman, Fort Atkinson, Wis., weekly..... 1.00
Jersey Bulletin, Indianapolis, Ind., weekly..... 2.00

PUBLICATIONS OF THE MARYLAND EXPERIMENT STATION.

*Bulletin No. 1, June, 1888, History, Organization, and work of the Station.
" " 2, Sept., 1888, Cutting Seed Potatoes for Planting. Appendix, with Information About Station.
* " " 3, Dec., 1888, Fodder-Corn and Fodder-Cane. Appendix, About Taking and Sending Samples.
" " 4, March, 1889. Experiment Orchard.
" " 5, June, 1889, Horticultural Department and Field Experiments.
" " 6, Sept., 1889, Commercial Fertilizers.
" " 7, Dec., 1889, Farm Manures.
" " 8, March, 1890, Some Feeding Trials.
* " " 9, June, 1890, Strawberries.
" " 10, Sept., 1890, Wheat.
* " " 11, Dec., 1890, Tomatoes.
" " 12, March, 1891, Pig Feeding.
* " " 13, June, 1891, Strawberries.
" " 14, Sept., 1891, Wheat.
" " 15, Dec., 1891, Experiment Vineyard.
* " " 16, March, 1892, Wheat Insects.
* " " 17, June, 1892, Strawberries and Seed Potatoes.
* " " 18, Oct., 1892, Sweet Potatoes.
* " " 19, Dec., 1892, Tomatoes.
* " " 20, March, 1893, The Composition and Digestibility of the Different Parts of Corn Fodder.
* " " 21, June, 1893, The soils of Maryland.
" " 22, Sept., 1893, Steer Feeding: a Well Balanced vs. a Poorly Balanced Ration.
* " " 23, Dec., 1893, Injurious Insects of Maryland.
" " 24, Feb., 1894, Composition of Commercial Fertilizers Sold in This State.
* " " 25, March, 1894, Agricultural and Horticultural Departments. Corn, Potatoes, Tomatoes, Strawberries, Grapes, &c.
" " 26, June, 1894, Tobacco.
" " 27, Aug., 1894, Composition of Commercial Fertilizers Soldni This State.

Bulletin No. 28, Sept., 1894, Experiments with Wheat and Barley.
" " 29, Dec., 1894, Further Investigations on the Soils of Maryland.
" " 30, Jan., 1895, Composition of Commercial Fertilizers Sold in This State.
" " 31, March, 1895, Potato Experiments.
" " 32, April, 1895, The San Jose Scale.
" " 33, April, 1895, Horticultural and Agricultural Departments. Small Fruits, Vegetables and Field Corn.
" " 34, July, 1895, Composition of Commercial Fertilizers Sold in This State.
" " 35, Sept., 1895, Wheat, Barley, Oats and Hay Experiments.
" " 36, Dec., 1895, Steer Feeding : a Well Balanced vs. a Poorly Balanced Ration
" " 37, Feb., 1896, Composition of Commercial Fertilizers Sold in This State.
" " 38, March, 1896, Potato Experiments.
" " 39 April, 1896, Spray Calendar.
" " 40, Aug., 1896, Composition of Commercial Fertilizers Sold in This State.
" " 41, Sept., 1896, Test of Methods of Preparing and Feeding Corn Fodder.
" " 42, Oct., 1896, The Md. Trees and Nursery Stock Law and Other Information of Special Interest to Nurserymen and Fruit Growers.
" " 43, Dec., 1896, Report upon the Value of a New Corn Product.
* " " 44, Dec., 1896, The Soils of the Hagerstown Valley.
* " " 45, Feb., 1897, Commercial Fertilizers Sold in This State.
" " 46, March, 1897, Corn and Potato Experiments.

*Special Bulletin (A), Fair Edition, 1889, Facts About the Station.
* " " (B), July, 1890, Potash and Paying Crops.
" " (C), Oct., 1890, Composition of Commercial Fertilizers Sold in This State.
* " " (D), Feb., 1891, Composition of Commercial Fertilizers Sold in This State.
* " " (E), Aug., 1891, Composition of Commercial Fertilizers Sold in This State.
* " " (F), Jan., 1892, The Agricultural Outlook for Maryland.
" " (G), Feb., 1892, Composition of Commercial Fertilizers Sold in This State.
" " (H), July, 1892, Government Direction of Agriculture in Europe.
* " " (I), Aug., 1892, Composition of Commercial Fertilizers Sold in This State.
* " " (J), Feb., 1893, Composition of Commercial Fertilizers Sold in This State.
* " " (K), June, 1893, Composition of Commercial Fertilizers Sold in This State.

First Annual Report of the Maryland Agricultural Experiment Station, 1888.
Second " " " " " " " " 1889.
Third " " " " " " " " 1890.
*Fourth " " " " " " " " 1891.
Fifth " " " " " " " " 1892.
Sixth " " " " " " " " 1894.
Seventh " " " " " " " " 1893.
Eighth " " " " " " " " 1895.
Ninth " " " " " " " " 1896.

*Edition exhausted—no more for distribution.

MARYLAND

Agricultural Experiment Station.

BULLETIN NO. 48.

Some Common Injurious Plant Lice With Suggestions for Their Destruction.

COLLEGE PARK, MD.

JUNE, 1897.

MARYLAND

Agricultural Experiment Station.

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NOTICE.

The bulletins of the Station will be mailed free to any citizen of Maryland who sends his name and address to the Station for that purpose.

Correspondents will please notify the Director of changes in their post-office address, or any failure to receive the bulletins.

ADDRESS,

MARYLAND AGRICULTURAL EXPERIMENT STATION,

COLLEGE PARK, MD.

SOME COMMON INJURIOUS PLANT LICE

WITH SUGGESTIONS FOR THEIR DESTRUCTION.

By Willis G. Johnson, Entomologist.

INTRODUCTION.

There has been such a demand for information regarding plant lice this spring we have thought it wise to issue in bulletin form a general account of some of the common injurious species of the State. Conspicuous among those that have been observed by us or sent to the Station for determination are those infesting the cherry, peach, plum, apple, elm, willow, wheat, cantaloupe, tomato, cabbage, lettuce, strawberry, rose and chrysanthemum. The season has been an exceptionally favorable one for their development and multiplication.

From the economic standpoint the melon plant louse is the most important. For several years past it has inflicted heavy losses upon the cantaloupe growers of this State, the destruction of the crop last season being complete in many counties. The heaviest losses were sustained in the counties of Anne Arundel, Baltimore, Howard, Prince George's, Wicomico, Worcester and Somerset. Talking with some of the principal cantaloupe growers of Somerset County recently, I obtained some data from which I have made a general estimate of the loss occasioned by the melon louse last year. Mr. Wm. DuBois, of Edwin, informed me that he lost over a thousand dollars' worth of cantaloupes last summer. He said, the melons made a fine growth early in the season, and when the fruit was about the size of one's fist the lice appeared in great numbers and destroyed them. Mr. W. M. Wooster, of the same place, had a similar experience. From figures furnished me by Mr. DuBois and Mr. Wooster I estimated the loss last year, within a radius of two and a-half miles from Edwin, to be between five and six thousand dollars; while the loss over the area known as Revel's Neck, I have placed at ten thousand dollars, and for the whole County of Somerset, twenty-five thousand dollars. From data we now have in hand it is reasonable to roughly estimate the losses last season in this State at over a hundred thousand dollars.

Before taking up the discussion of the several species treated in this bulletin, it will be good policy, perhaps, to consider the life history of plant lice in a very general way.

GENERAL STATEMENT.

There are many characters about plant lice which separate them from other insects. They belong to the order Hemiptera, or true bugs,

and to that sub-order known as Homoptera, from the fact that their wings are of a uniform texture throughout. Their mouth parts consist of a long lance-like tube, in which four very fine bristles are concealed. They insert this beak into the tissues of the plant and feed by sucking its sap. There is, therefore, a constant drain upon the life's blood of a plant, the completeness of the destruction, of course, depending upon the number of lice upon it. With this constant drain on its vitality the plant soon stops growing, the leaves curl and wilt, the stem becomes hard and woody and finally dies. From these considerations it is clear that an insect, which draws its food supply from within the tissues, cannot be destroyed by a remedy that will destroy one which eats the foliage or plant. A plant louse might feed upon a leaf that was covered with Paris green and not be any worse off. It could push its beak through the poison into the tissue of the plant and feed until it was satisfied without being injured in the least.

The life history of the various species of plant lice differ somewhat, yet in a general way they agree. Our commonest species are greenish, brownish or blackish, soft-bodied creatures, with rather long legs and antennae. There are winged and wingless forms. The body is more or less pear-shaped, with two little tubes projecting backward from the upper part of the hinder end of the body. From these tubercles there is excreted a sweetish liquid, almost as clear as water, known as honey-dew. Some species produce this honey-dew in such quantities as to form a glistening coating on the leaves and branches of the plant they infest. Bees, wasps and ants are particularly fond of this subtance, and feed voraciously upon it. The ants recognize the source of the food, and tenderly care for the lice, very much the same way as the herdsman shelters and protects his cattle. In fact, some species of lice are dependent upon the ants. For instance, there is a small bluish-green louse, (*Aphis maidis*), which infests the roots of corn and other plants, which is always attended by a little brown ant (*Lasius alienus*), which cares for them as attentively as it does its own eggs and young. Late in the fall these ants take the eggs of the lice deep into their subterranean galleries and guard them over winter. As soon as the young have hatched in the spring the ants tunnel the roots of corn or various weedy plants, and establish the little lice upon them. Many persons believe that ants destroy plant lice, from the fact that where the one species is found the other is usually associated with it. Instead of being beneficial they are indirectly injurious, as they transport the lice from plant to plant, thus distributing them over large areas.

Plant lice are remarkable in their mode of development, from the fact that the females produce living young. We also have exhibited here a striking case of parthenogenisis, that is, the production of young, generation after generation, without the intervention of the male. This is known as agamic reproduction, or reproduction by budding. This continues throughout the summer, when late in the fall the male is produced, fertilizes the female, and eggs are laid which pass the winter. These eggs produce only females. They appear early in the spring, are winged, and are known as stem-mothers (See Fig. 1.) She produces living young, all of which are females, no males appearing as indicated

above, until late fall. The young may be either winged or wingless, or both. It is not an uncommon thing to see the agamic mother walking around unconcernedly feeding, and at the same time giving birth to a

FIG. 1. MELON PLANT LOUSE, (After J. B. Smith).

young louse. The wingless forms are usually most numerous, and on account of their great fecundity provide for the increase of the progeny. This rapid multiplication would be disastrous to the species in consequence of the failure of the plant to supply the necessary food for so many individuals; thus it is, that the winged forms are produced in order to perpetuate the species, as they migrate to other plants and start new colonies. It is also at the critical moment when a plant becomes overstocked with lice that ants are most active carrying the delicate little wingless creatures from place to place, establishing them where their favorite food supply is abundant.

There are many general exceptions in the life histories of plant lice, as for instance when a species feeds upon a plant that dies out early in the season, there must be an alternating food plant. Such a case is seen in the hop-louse, which spends the summer upon the hop, multiplying very rapidly, often causing great injury. When the vines mature, the males are produced, and all the lice fly to plum trees, where the sexual female is born. Eggs are then laid which pass the winter. Two or more generations mature on the plum in the spring, and when the hop vines are again well started, the winged forms migrate to their summer food plant. The melon plant louse is another example of this, as will be discussed later. The peach and wheat aphids are examples where the lice feed upon the plant part of the season and then infest the roots.

THE MELON PLANT LOUSE.

(*Aphis gossypii.*)

This insect, as noted above, is one of very great importance from the economic standpoint in this State. Its wide range of food plants

make it a difficult pest to combat until it reaches the cantaloupe field. As soon as the cantaloupes are above the ground the louse appears; the time, of course, depending upon the location and the weather conditions. In Somerset County it has been observed upon the leaves of cantaloupe as early as May 15; while in the Counties farther north and in Prince George's and Anne Arundel Counties its presence was not noticed this season until about June 15. A few lice scattered here and there over a patch are only the advance guard, and a timely warning that the invading army is near at hand. The time to act is while the plants are young and while the lice are comparatively few in numbers. If a leaf is examined a few days after the winged individual appears upon it, it will be observed that there are several young lice about the mother. They are wingless and quite small; but what they lack in size they soon make up in numbers, as they begin to produce living young in about a week. A colony thus formed upon a leaf, the parent insect (Fig. 1) migrates to others and starts a new one. Thus, this goes on for a few weeks from hill to hill; when finally the whole field is infested and the vines soon shrivel and die. A field that has been overrun by these pests is certainly a sad sight to behold. Vines that were a few days before looking thrifty and vigorous, with the promise of a good crop, are now dead and brown, the leaves curled and shriveled, and the fruit sunken and dry.

As soon as the vine no longer furnishes the proper nourishment for the lice, the winged forms fly to other hills or fields, and the wingless forms either perish or are carried by ants to plants in the vicinity, as already mentioned. This accounts for their sudden appearance oftentimes in a field that has been comparatively free from their attacks.

As intimated, this louse is not particular what it feeds upon before the cucurbs are available or after they disappear. Mr. Theodore Pergande, an assistant in the Division of Entomology, United States Department of Agriculture, has given this subject much study, and has recorded this insect as feeding upon about 30 species of plants, not including the melons, squashes, etc. The list not only includes many of our common weeds, field and garden crops, and hot-house plants; but embraces also some orchard and forest trees. In October Mr. Pergande has observed it upon the following plants: Purslane, shepherd's-purse, pepper-grass, Amarantus sp?, dock, burdock, dandelion, pigweed, wormseed, plantain, chickweed, morning-glory, three-seeded mercury, buttonweed, ground ivy, red clover, mallow, cultivated strawberry, dwarf bean, cotton, and European dogwood. He has also found it upon Indian strawberry, abundant on the underside of the leaves during November and December, scattered on the leaves of spinach in November, quite common on young leaves of pear in June, and upon the leaves of orange, in the orange house of the Agricultural Department, almost any time of the year. Mr. Pergande says they were very abundant on many hothouse plants, especially upon Hydrangea and Begonia, and upon the leaves of Jamestown weed growing in the department insectary.

From this very wide range of food plants we are led to believe that the insect can live upon almost any plant. We are indebted to Mr. Pergande for many points regarding its life history. He has observed the

sexes late in the fall, and found eggs upon purslane in October and on strawberry plants in January. It seems possible that some of the viviperous forms, that is, those that produce living young, live over winter, as Mr. Pergande has observed them as late as January, "even after heavy frosts, sleet and snow." They appear very early in the spring, and under favorable conditions soon overstock the plants upon which they are feeding, and migrate to the melons. Having considered the habits of this insect in a general way, we will now turn to the

PREVENTIVE AND REMEDIAL MEASURES.

First of all, the cantaloupe grower should be a keen observer. He should not wait until the leaves of the growing plants begin to curl and wrinkle before he is aware of the presence of this formidable enemy. The time to begin the warfare against it, is when that mother of mothers first makes her appearance. One killed then is equal to thousands destroyed a few weeks later. From what we have said about the food plants of the insect it is clear that there is much to be done in the way of prevention by clean fields, fence corners and roadways. Little can be accomplished by the efforts of the individual farmer if his neighbors are careless and indifferent about this important matter. If anything is to be done to check the ravages of this pest in any community it must be done by organization and the concerted action of all concerned. It would be almost useless for one farmer to rake up and burn all the old vines in a field as soon as the crop of cantaloupes was gathered, cut and burn the weeds in the fence rows and along road sides, if his neighbors did nothing. While the lice do not fly long distances on account of their frailness, they are often carried by the winds. The flight usually takes place during warm, sunny days, and it is then that the fields of the careful observer, who has done everything possible to protect his crops, are invaded by the innumerable host from the fields of a neighbor who has done nothing, and whose crop has been destroyed.

The time has come, as many a melon-grower knows from sad experience, when he must put on the armor of warfare and fight these ravenous pests. The work should begin in the autumn, as soon as the melons have been gathered, by raking and burning all the old vines. Following this, weeds in fence corners and along road sides should be mown, dried and burned. Weedy fields should be plowed in the fall wherever it is practicable. By this general cleaning up, myriads of the food plants upon which the insects deposit their eggs and spend the winter will be destroyed, to say nothing of the destruction of large numbers of lice themselves. The same method should be pursued in the spring as early as possible, and clean cultivation in the vicinity of fields that are to be planted in melons is desirable. These suggestions are given as preventive, preparatory to the appearance of the lice upon the vines.

As soon as the plants are through the ground and the leaves begin to appear, a careful watch should be kept for the first indication of the presence of the lice. If discovered, the leaf should be plucked, burned or buried, and the hill thoroughly treated with kerosene emulsion, a combination of common coal oil, soap and water, described below. I

have found this material very effective in the destruction of plant lice; but when used in a melon field it must be applied thoroughly and carefully. Oil and water will not mix by stirring with a spoon or paddle, or by pouring from one vessel to another. The degree of success attained will depend (1) upon the completeness of the emulsion, (2) the kind of apparatus for applying it, (3) the definite location of the infested hills, and (4) the thoroughness of the spraying.

Kerosene emulsion must be made explicitly according to directions, or the results of its application on plants will not be satisfactory. It is made as follows:

Hard (or soft) soap (ivory soap preferable).....½ pound.
Water (rain water if convenient).....1 gallon.
Kerosene (common coal oil).....2 gallons.

Put the water in a vessel holding four or five gallons, add the soap by shaving it in thin pieces, place on a stove and bring to the boiling point, occasionally stirring it to dissolve the soap; then remove to the yard, or some convenient place away from the fire, and pour the kerosene directly into the water. This should then be pumped in and out of the vessel with a good force pump for from five to ten minutes, or until the emulsion is formed. If properly made, it will have the appearance of buttermilk, and will readily mix with water without any oil coming to the surface. It will keep an indefinite length of time, becoming a semi-solid when cold. If used when fresh it can be diluted with cold water to

FIG. 2. BENT NECK FOR UNDERSPRAYING.

strength desired; but if cold and hard warm water should be used. For the melon louse, the emulsion must be diluted with from 12 to 15 parts of water; that is, to every gallon of emulsion, 12 to 15 gallons of water are added. This may seem like a troublesome method; but it is, in practice, a very simple operation.

To meet the demand for kerosene emulsion already prepared, some firms are now making it in large quantities. It can be bought from the Powell Fertilizer and Chemical Company, Baltimore, at about 10 cents per pound in 25-pound cans, making the cost of the wash about one cent a gallon.

The material having been prepared, it is now ready to be applied This can be done best by any good spray pump. There are upon the market many types of spraying apparatus, and in many cases the planter chooses that which seems best for general purposes. For all round work with lice, I have found the knapsack and hand sprayers most convenient and useful. In using these machines it is very necessary that a bent brass extension rod for underspraying should be attached. One of these

connections is shown in the illustration, Fig. 2. It should be used with a single nozzle, and can be bought without nozzle for about 75 cents.

The perfected Galloway knapsack sprayer, with the Weed kerosene attachment, Fig. 3, is an excellent device, and does away with the making of kerosene emulsion, as the pure oil and water are mechanically

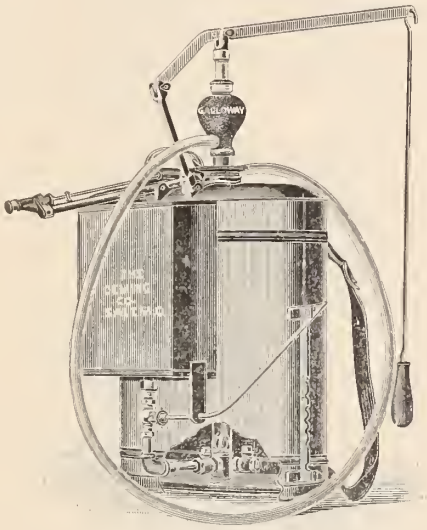

FIG. 3. KNAPSACK SPRAYER.

thrown together in the pipe and out the nozzle. Any desired strength can be obtained by simply placing the lever at the side in the proper notch. The kerosene can be placed in the small tank, the water in the large one, and the whole outfit carried into the field on one's back. The price of the outfit is about $15.00.

The most convenient and most useful device I have ever used is a little hand pump manufactured by the Deming Company, Salem, O. It is known as the "Success Kerosene Emulsion Sprayer," and was placed upon the market this spring for the first time. The whole outfit is illustrated at Fig. 4. In addition to the kerosene tank, it has a combination bucket clamp and foot rest, and can be carried any place it is desired. It can be used in any ordinary bucket, the only preliminary necessary is to fill the tank with kerosene, the bucket with water, set the gauge and begin operations. This also does away with the the making of the emulsion, as the mixture practically takes place in the pump, but more largely, however, in the nozzle, where the oil and water are divided into the very finest particles in a mist-like spray.

Several large cantaloupe growers in this State, who are using this apparatus against the melon louse this season, report very satisfactory results. In using the machine, the pointer is set to the "1-15" mark on the index or gauge. This gives one part of kerosene to fourteen of water. This outfit, with the bent brass extension, Fig. 2, has proved, so far, the most

convenient device yet used by us for combating the melon louse in the field. Of the various nozzles, I prefer the "Pacific Cyclone" (Fig. 5), manufactured by the Gould Manufacturing Company, Seneca Falls, N.

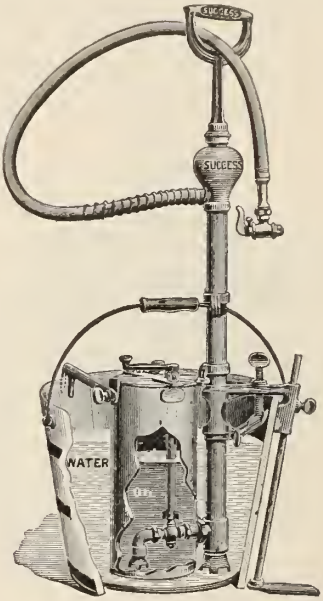

FIG. 4. SUCCESS KEROSENE SPRAYER.

Y. It can be bought for about 65 cents. The "Bordeaux" (Fig. 6), and "Vermorel" (Fig. 7), made by the Deming Company, are also both good nozzles for general purposes. They cost about 75 cents each.

Bisulphide of carbon has been used with gratifying success for the destruction of the melon plant louse. In using this material it is necessary to first cover the hill with a tight box, tub, barrel or other appli-

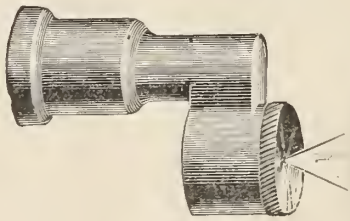

FIG. 5. CYCLONE NOZZLE.

ance, in order to retain the fumes of the liquid, which creates a death atmosphere. This method is somewhat tedious, but very effective. One dram, an equivalent of about one teaspoonful, of bisulphide of carbon

evaporated in one cubic foot of air space will kill every louse upon a hill and not injure the vines. To follow up this method, the grower must provide himself with covers and bisulphide of carbon in advance. The chemical is not expensive. A grade known as "Fuma Bisulphide of Carbon," manufactured by Edward R. Taylor, Cleveland, O., can be purchased in 25 and 50-pound cans at 10 cents per pound, or in smaller quantities for a little more per pound. Whatever method is used to combat these insects, the grower knows full well that it can be accomplished only by an intelligent and persistent application of the remedies suggested.

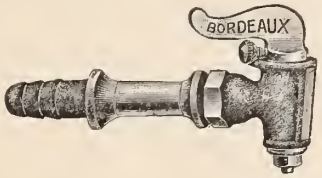

FIG. 6. BORDEAUX NOZZLE.

FIG. 7. VERMOREL NOZZLE.

THE CABBAGE LOUSE.

(*Aphis brassicæ*)

The cabbage louse is an old-time enemy, and has been known in this country since 1791. It is very common in Europe, and it is quite probable that it came to us from that country. It is distributed throughout this State; its ravages being most apparent in the trucking sections. It appears early in the season, even attacking young cabbage grown for transplanting. It also attacks turnips and radishes to a greater or less extent. The winged viviparous female is a greenish-gray in color, and is shown in the illustration, Fig. 8. Flight usually takes place during very warm weather, and it is not an uncommon sight with us to see the air filled with them in August. The complete life history of this pest is still unknown.

The same remedies suggested for the melon plant louse can be used for this insect. They congregate on the underside of the leaves in great numbers, where they can be reached to best advantage by a spray, directed with the bent brass extension. Dr. J. B. Smith, of New Jersey, has found that whale oil soap at the rate of one pound to eight gallons of water is perfectly effective. Fine tobacco dust can also be used to good

advantage, if the cabbage is sprinkled with it while it is wet. At any

FIG. 8. CABBAGE LOUSE, (After J. B. Smith).

event, no time should be lost in applying some remedy as soon as the lice make their first appearance.

THE BLACK PEACH LOUSE.

(*Aphis persicæ-niger.*)

On account of the unusual abundance of this insect in this State this year, many inquiries have been received concerning it. It has been particularly abundant in newly planted orchards and in some nurseries. Many trees in old orchards have been seriously injured by its ravages. In many respects it is a pest of as great importance to the peach-grower as the melon louse is to the cantaloupe grower. Dr. E. F. Smith, an assistant in the Division of Vegetable Physiology and Pathology of the United States Department of Agriculture, who described this insect some years ago, says: "I saw them clustered upon so many shoot axes, and so compactly, as to kill young trees, and even very considerable branches of older trees. They were especially destructive to nursery trees and to orchards just planted. I saw one nursery in which at least 100,000 trees had been killed outright in two or three weeks' time. I also heard of half a dozen large nurseries which were entirely destroyed or very seriously affected, and of orchardists who will be compelled to replant hundreds of trees."

Trees badly attacked by this insect are very conspicuous, even at a distance. The leaves are yellowish, more or less clustered, many of them being curled and spotted from the attacks of fungi. The general drain upon the vitality of the tree is obvious from its dwarfed and stunted growth.

Unlike the other lice discussed, this insect is black or brownish. The wingless are slightly stouter than the winged forms. As I have already intimated, this insect is found also upon the roots of the peach, where it breeds undisturbed. It makes its appearance, often assisted by ants, to the surface of the ground early in the spring, establishing itself upon the new shoots. Here the winged forms are developed, which fly to other trees and start new colonies. They feed until about midsummer, and work their way down upon the roots. There does not seem to be any quiescent stage in the life of this pest. They are known to breed the year around; but there are many points about its life history yet to be worked out.

Where the insect is found upon old trees, it is best to cut out the infested twigs and burn them. It is killed readily with kerosene emulsion or whale oil soap, but it must be borne in mind that the black or brownish lice are more resistent to the sprays than the green species. The sprays must, therefore, be used in stronger solution. Kerosene emulsion, diluted 10 to 12 times with water, and one pound of whale oil soap in 6 gallons of water would serve to accomplish the result. When the pest gains a foothold in a nursery, the most satisfactory method is to dig up the stock and burn it. Dr. J. B. Smith recommends periodical dressings of kainit of potash. He says: "This will not only act as an efficient fertilizer, but will also serve to destroy many lice. The application should be made just before a rain if possible, so that the salts can be at once dissolved and carried into the ground. Wherever the solution comes into contact with the aphides it will kill them, and the salts will remain until taken up by the plant. The kainit is better than the muriate, because it contains more salt, and at the same time it seems less likely to injure vegetation if put on too heavily. The application should be made when the injury to the trees is noticed, that is, when they look sickly, refuse to grow without apparent cause, or when an examination shows the presence of the lice in the orchard."

THE CHERRY LOUSE.

(*Myzus cerasi*)

The cherry louse resembles the peach louse in general coloring and outline. It has been very common throughout the State this spring, and has done considerable injury to young trees by dwarfing their growth. It has no subterranean habits, and completes its life cycle upon the cherry tree. Early in the spring, as soon as the leaves have fairly started, the lice appear, and multiply very rapidly. They are not so abundant during midsummer; but increase again in September. The sexes appear in October and the eggs are laid at the base of the buds and in cracks or any depressions in the bark, where they remain over winter and hatch the following spring. This insect very rarely attacks other plants.

The same remedies suggested for the peach louse upon the foliage are applicable in this case. The spraying, however, should be followed up a second time late in September or early in October, in order to de-

stroy as many of the sexual individuals as possible before the eggs are deposited.

The many other species of plant lice observed by us or referred to the Station for determination, cannot be discussed at this time. I will now pass to a few general remarks about

NATURAL ENEMIES.

Plant lice, like most insects, have certain natural enemies that tend to keep them in check. Prominent among these are the parasitic and predaceous insects. The former are very minute creatures resembling wasps, which usually lay their eggs upon the lice. These eggs hatch into small magots, which enter the bodies of the lice, where they feed upon the body juices until they are full grown. They then transform to pupae within the body of their host, from which they finally emerge by cutting a round hole through the body of the louse. Close examination of a colony of most any louse will reveal several yellowish or brownish remains of individuals which have succumbed to parasitism.

The predaceous insects live by actually feeding upon the lice. The ladybirds or ladybugs are, by far, the most important factors in the destruction of plant lice, as both the adults and young feed ravenously upon them. There is a notion prevalent in some parts of the State that ladybirds, in some way or other, produce plant lice. Natural laws will not permit such a state of affairs. Like begets like in the insect world just as persistently as it does in the higher animals. The progeny of a ladybird is always a ladybird like the parent insect. The young of the ladybird, however, looks very different from the adult. In fact, the young of some species resemble minute alligators in general appearance, and are gaily colored. They feed almost entirely upon soft bodied insects.

Among other insects that feed upon plant lice, the young of the Syrphus fly must be mentioned here. In nearly every colony of lice these little slug-like worms or larvae can be seen. They move about, raising their heads high in the air, and striking here and there. Whenever an unlucky louse is touched it is seized, held aloft until its juices have been sucked out, when its empty skin is cast aside and the worm seeks others.

SPECIAL NOTE.

Persons residing within this State are requested to send specimens of plants injured by insects or disease to this office for identification whenever information is wanted regarding them. In sending insects for determination, especially larvae or worms, a small quantity of the food plant upon which they are found feeding should accompany the specimens. Such material, as a rule, enclosed in a small tin, wooden, or even a pasteboard box will stand transportation through the mail in good condition. In sending plants for determination, the leaf, flower and root should be represented when it is practicable to supply them.

The department of entomology is now adding to its equipment, and has undertaken to build up a collection of all the injurious insects of the

State, together with specimens illustrative of their injury. This collection will be carefully arranged and kept for the enlightenment of the general public and used for illustrating lectures. We earnestly solicit donations of any insects from any section of the State to add to our collection. A record will be kept of any material sent us and due credit given to the contributor.

ACKNOWLEDGMENT.

I am indebted to Dr. J. B. Smith, Entomologist, of the New Jersey Agricultural Experiment Station for electrotypes of figures 1 and 8. My thanks are also due to the Deming Company, Salem, Ohio, for electrotype cuts of figures 2, 3, 4, 6, and 7; and to the Goulds Manufacturing Company, Seneca Falls, N. Y., for figure 5.

MARYLAND

Agricultural Experiment Station.

BULLETIN NO. 49.

SPECIAL ISSUE.

COMPOSITION OF

COMMERCIAL FERTILIZERS

SOLD IN THIS STATE.

COLLEGE PARK, MD.

AUGUST, 1897.

MARYLAND

Agricultural Experiment Station.

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NOTE: Under the laws of Maryland, the inspection, sampling and analysis of commercial fertilizers is to be done under the auspices of the Maryland Agricultural College, by the Professor of Chemistry of the College, who is ex-officio State Chemist. The results of these examinations, being agricultural information of value and general interest, will be published, from time to time, as Special Bulletins, from the Maryland Agricultural Experiment Station.

These Bulletins will be mailed, free, to any farmer who asks for them.

ADDRESS,

MARYLAND AGRICULTURAL EXPERIMENT STATION,

COLLEGE PARK, MD.

INSPECTION AND ANALYSIS OF

COMMERCIAL FERTILIZERS SOLD IN MARYLAND.

BY THE CHEMICAL DEPARTMENT OF THE

MARYLAND AGRICULTURAL COLLEGE.

DR. H. B. McDONNELL, *State Chemist.*
H. C. SHERMAN, Ph. D., *Assistant Chemist.*
F. P. VEITCH, B. S., *Assistant Chemist.*
*F. B. BOMBERGER, B. S., *Assistant Chemist.*
W. W. SKINNER, B. S., *Assistant Chemist.*
J. R LAUGHLIN, B. S., *Assistant Chemist.*

The following table gives, side by side, the analysis of the various fertilizers as made in the laboratory and the guaranteed analysis as stamped on the bags. The figures indicate per cent. or parts in a hundred, except the columns headed "No.," which contains the respective numbers by which the samples are known in the laboratory, and the last two columns, which contain respectively the "comparative value found" by analysis and the "comparative value guaranteed," the former is calculated from the "analysis found," the latter is calculated from the "analysis guaranteed" as stamped on the bags; in each case using the following schedule of values for the varions ingredients:

In Mixed Fertilizer:	
For Nitrogen, calculated as Ammonia	15 cts. per pound.
" Potash (K_2O), in forms free from muriate	6 " " "
" Potash (K_2O), as muriate	5 " " "
" Available Pho-phoric Acid	6 " " "
" Insoluble Phosphoric Acid	3 " " "
" " " " when from S. C. Rock	2 " " "
In Dissolved S. C. Rock:	
Available Phosphoric Acid	5 " " "
In Ground Bone:	
For Nitrogen, calculated as Ammonia, in "Fine" Bone	14 " " "
" Nitrogen, calculated as Ammonia, in "Fine Medium" Bone	12 " " "
" Nitrogen, calculated as Ammonia, in "Medium" Bone	10 " " "
" Nitrogen, calculated as Ammonia, in "Coarse" Bone	8 " " "
" Phosphoric Acid in "Fine" Bone	5 " " "
" " " " "Fine Medium" Bone	4 " " "
" " " " "Medium" "	3 " " "
" " " " "Coarse" "	2 " " "
In Tankage:	
For Nitrogen, calculated as Ammonia	12 " " "
" Phosphoric Acid	3 " " "
In Nitrate of Soda:	
For Nitrogen, calculated as Ammonia	12 " " "

The Mechanical Analysis of ground bone is made by using a sieve with circular holes as follows:

Less than 1-50 inch, "Fine."
Less than 1-25 inch, "Fine Medium."
Less that 1-12 inch, "Medium."
Over 1-12 inch, "Coarse."

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*Assistant in Mathematics and English after July 1, 1897.

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3755	Alexandria Fert. & Chem. Co., Alexandria, Va.	Dissolved S. C. Rock....	Gaithersburg.....
3817	" " "	Dissolved S. C. Rock....	Williamsport.....
3753	A. Anderson & Co., Mt. Airy, Md.	Harvest Queen Guano..	Mt. Airy.....
3832	E. D. Arnold, Smallwood, Md.	Butcher House Bone....	Westminster.....
3602	J. H. Armstrong & Co., North East, Md.	Residium.....	Queen Anne.....
3649	Baltimore Guano Co., Baltimore, Md.	B. G. Potato Guano.....	Baltimore.....
3648	" " "	Game Guano.....	Baltimore.....
3855	Baltimore Pulverizing Co., Baltimore, Md.	Anti-acid Phosphate	Germantown. .....
3858	" " "	Crabster Mixture.....	Germantown.....
3857	" " "	Farmer's Favorite Fertz	Germantown.....
3856	" " "	Penniman's Tobacco Grower.	Germantown.....
3837	" " "	Pure Dissolved Animal Bone.	Westminster.....
3860	" " "	Special Potato Mixture..	Watersville.....
3717	Baltimore Seed & Implement Co., Baltimore, Md.	Ammoniated Soluble Bone.	Balt more.....
3713	" " "	Special Potato Fertilizer	Baltimore.....
3655	Baugh & Sons Co., Baltimore, Md.	Animal Bone & Potash Compound.	Baltimore. .....
3677	" " "	Bone Meal.....	Baltimore.....
3854	" " "	Corn Fertilizer.....	Baltimore.....
3692	" " "	Dissolved Animal Bone.	Baltimore.....
3695	" " "	Dissolved Steam Bone..	Baltimore..... ...
3794	" " "	Domestic Animal Bone Dust.	Colora..... .....

Maryland Agricultural College, February to July, 1897.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3755	.....	.....	.....	.....	.65	14.44	14	15.09	15½	$14.44	$14.00
3817	.....	.....	.....	.....	.77	14.93	14	15.70	15½	14.93	14 00
3753	1.10	1	1.09	1	3.50	9.75	9	13.25	10	18.19	15.40
3832	1.75	1¾	2.02	1¾	.71	9.41	8	10.12	.....	18.99	16 60
3602	.36	.....	3.15	.....	.....	.....	.....	.66	.....	5.12	.....
3649	2.78	2½	3.38	3	2.12	10.37	9	12.49	11	25.42	22 50
3648	2.90	2½	2.53	2½	1.42	9.28	9	11.70	11	23.22	22 00
3855	.....	.....	1.99	1¾	.82	5.52	5½	6.34	5½	7.89	7 25
3858	.....	.....	2.15	.....	.70	4.64	.....	5.34	.....	7.07	.....
3857	1.04	1	2.58	1¾	1.02	5.78	5½	6.80	.....	13.25	12 85
3856	2.52	2	2.18	2	1.72	8.28	7	10.00	.....	20.71	16.40
3837	2.20	2	.....	.....	5.95	10.98	15	16.93	.....	23.35	24.00
3860	3.04	2	3.48	4¼	1.30	5.08	4½	6.38	.....	20.18	16 65
3717	1.36	1	2.81	1½	2.16	7.54	7	9.70	8	17.24	13 50
3713	1.99	1½	5.16	4½	1.73	7.79	6½	9.52	7½	21.52	17.40
3655	2.69	3	2.14	2	4.11	8.38	8	12.49	10½	22.74	22 10
3677	4.84	4	.....	.....	.....	.....	.....	22.88	21½	30.89	.....
3854	2.44	2	.....	.....	2.09	8.92	8	11.01	11	19.27	17.40
3692	3.64	3	.....	.....	2.74	15.22	11	17.96	16	30.80	25.20
3695	2.35	2	.....	.....	1.44	18.67	15	20.11	.....	30.31	24 00
3794	2.41	2	.....	.....	.....	.....	.....	27.19	25	29.61	.....

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3660	Baugh & Sons Co., Baltimore, Md.	Double Eagle Phosphate	Baltimore
3725	" " "	Export Bone with Potash	Baltimore
3670	" " "	Fish Mixture	Baltimore
3665	" " "	General Crop Grower	Baltimore
3647	" " "	H. G. Acid Phosphate or Dissolved S C. Rock.	Baltimore
3654	" " "	H G. Tobocco & Truck Fertilizer	Baltimore
3683	" " "	H G. Truck Fertilizer	Baltimore
3642	" " "	Old Stand-by Raw Bone Super Phosphate	Baltimore
3864	" " "	Six per Cent. Peruvian Guano.	Baltimore
3707	" " "	Potato Fertilizer	Baltimore
3696	" " "	Seven per Cent Potato Guano.	Baltimore
3701	" " "	Robinson's Tomato Grower.	Baltimore
3664	" " "	Soluble Alkaline Super Phosphate.	Baltimore
3754	" " "	Sullivan's Sure Success.	Monrovia
3724	For J. W. Sullivan.	Tomato Compound	Baltimore
3736	Beck, Walker & Brown. Chestertown, Md.	Corn Super Phosphate	Chestertown
3735	" " "	Tomato Super Phosphate.	Chestertown
3676	" " "	Special Mixture	Baltimore
3770	The Berg Company, Philadelphia Pa.	$25 Bone Manure	Elkton
3769	" " " "	Raw Bone	Elkton
3867	C. M. Bohannan & Co., Baltimore. Md.	Leader for Tobacco and General Crops.	Baltimore

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3660	2.77	2½	1.24	½	2.86	9.25	8	12.11	10½	$22.37	$19.10
3725	2.81	2	2.60	2	5.44	7.44	.....	12.84	11	23.22	21 20
3670	2.70	2	3.61	2	1.95	8.78	8	10.73	.....	23.42	17.60
3665	1.88	1	1.18	1	1.72	8.87	8	10.59	.....	18.49	13.60
3647	...	.....	....	.....	1.29	14.99	14	16.28	15	14.99	14.00
3654	3.32	3	3.28	3	2.77	10.73	8	13.50	10½	27.78	23.10
3683	3.52	3	4.90	3	1.23	12.37	8	13.50	10½	31.04	23.10
3642	2.60	2	1.19	1	2.13	9.34	8	11.47	10½	21.48	18.10
3864	5.37	6	1.26	.....	6.62	6.46	.....	13.08	....	29.10	18.00
3707	2.37	2	2.59	2	2.54	10.88	8	13.42	13	24.28	20.60
3696	8.07	7	2.74	5	.90	9.53	6	10.43	8	38.93	34.40
3701	4.97	4	3.19	2	1.89	9.21	10	11.10	.....	30.28	26.00
3664	.....	.....	2.24	2	1.01	11.83	10	12.84	.....	14.47	12.10
3754	2.86	2	3.28	2	3.37	9.33	10	12.70	.....	25.08	20.00
3724	2.71	2	2.08	2	2.54	9.86	8	12.40	10	23.56	18.80
3736	1.05	½	5.05	4	.75	8.66	8	9.31	.....	19.04	15.10
3735	2.69	2	4.17	2½	.45	8.03	8	8.48	.....	22.21	18.10
3676	2.24	.....	4.96	.....	2.90	7.08	.....	9.98	.....	21.92	.....
3770	2.58	2	2.90	2	3.80	7.63	7	11.43	9	22.08	17.60
3769	4.99	4	.....	.....	.....	.....	.....	21.60	20	28.77	.....
3867	2.60	2½	2.94	2½	1.93	10.71	8	12.64	.....	24.75	19.60

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3804	Brumfield & Foster, Colora Md.	Acid Phosphate and potash.	Colora
3803	" " "	Ammoniated Bone Phosphate	Colora
3802	" " "	H. G. Acid Phosphate...	Colora
3885	Chemical Co. of Canton Baltimore Md.	Baker's Dissolved Bone Phosphate.	Westminster
3806	" " "	Baker's Special Wheat and Grass Mixture.	Belair
3723	" " "	Baker's Standard Ground Bone.	Baltimore
3836	" " "	Harrow Brand	Westminister
3721	" " "	Potato Manure	Baltimore
3722	" " "	Pure Dissolved S. C. Bone.	Baltimore
3720	" " "	Red Clover	Baltimore
3793	R. L. Cristie & Co. Colora Md.	Soluble Bone & Potash	Colora
3798	E. A. Clendennin & Bro. Colora, Md.	Farmers' Favorite Vegetator.	Colora
3797	" " "	H. G. Acid Phosphate...	Colora
3800	" " "	National Standard Phosphate.	Colora
3801	" " "	Pure Ground Bone	Colora
3799	" " "	Soluble Bone Phosphate.	Colora
3795	" " "	Special Potato and Truck Compound.	Colora
3796	" " "	Wheat and Grass Special Compound.	Colora
3788	Josiah Cope & Co., Lincoln University, Pa.	Acidulated Phosphate...	Rising Sun
3787	" " "	Ammoniated Bone Phosphate.	Rising Sun
3791	" " "	Pure Steamed Bone	Rising Sun

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3804	.....	.....	2.23	2	1.70	11.04	11	12.74	.....	$13.95	$13.00
3803	2.08	2	2.18	2	.97	10.35	9	11.32	.....	21.44	18.80
3802	.....	.....	.....	.....	1.66	14.00	14	15.66	.....	14.00	14.00
3835	.....	.....	....	.....	1.66	14.63	13	16.39	15	14.63	13.00
3806	1.29	1	2.29	2	1.97	9.64	9	11.61	11	18.91	17.00
3723	5.56	4	....	.....	.....	.....	.....	21.50	20	33.15	.....
3836	.71	½	1.38	1	1.28	10.24	10	11.52	12	16.57	15.70
3721	1.35	1	4.21	4½	1.63	9.20	8	10.83	10	20.28	18 30
3722	... ...	... .	.....	.....	.75	14.73	14	15.48	.....	14.73	14.00
3720	1.45	1	2.07	2	1.35	6.46	5	7.81	6	14.98	11.60
3793	.....	.....	1.83	2	1.40	11.53	11	12.93	13	13.92	13.80
3798	1.04	1	1.35	1	1.31	9.20	9	10.51	.....	16.30	14.80
3797	.....	... ...	.....	.....	2.01	13.74	14	15.75	.....	13.74	14.00
3800	1.17	1¼	1.80	1½	1.77	10.95	10	12.72	13	19.51	19.80
3801	6.93	4	.....	.....	.....	....	.....	18.82	22	33.23	.....
3799	.....	.....	2.04	2	1.62	10.33	10	11.95	11	12.98	12.40
3795	3.82	3	3.26	6	1.35	7.20	6	8.55	.....	24.17	22.20
3796	1.82	1¼	5.05	2	.98	9.13	9	10.11	.....	22.06	16.55
3788	.....	.....	.....	.....	1.35	14.44	13	15.79	.....	14.44	13.00
3787	1.11	1	1.60	2	1.83	10.07	12	11.90	.....	18.11	19.40
3791	2.71	2	.....	.....	.....	.....	...	26.12	24	29.39	.....

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3786	Josiah Cope & Co., Lincoln University, Pa	Try Me Bone Phosphate.	Rising Sun .....
3710	Edward L. Coulson, Baltimore, Md.	Pure Fine Ground Bone.	Baltimore..... ...
3846	Crocker Fertilizer & Chemical Co., Buffalo, N. Y.	Potato. Hops and Tobacco.	Maple Grove.....
3762	Wm. Davison & Co., Baltimore, Md.	Bos Ammoniated Super Phosphate.	Baltimore.....
3807	" " "	H G. Ammoniated Super Phosphate.	Belair.....
3763	" " "	Penn Mar Ammoniated Super Phosphate.	Baltimore..... ....
3861	" " "	Special Mixture.....	Baltimore.....
3730	L. E. P. Dennis & Sons Crisfield. Md.	Fish and Potash Mixture No. 2.	Ridgeley.....
3671	" " "	Truck and Tomato Grower.	Baltimore.....
3658	Detrick Fertilizer & Chemical Co., Baltimore, Md.	Corn Fertilizer.....	Baltimore.....
3659	" " "	Disolved Bone.....	Baltimore.....
3657	" " "	Dissolved S. C. Bone....	Baltimore.....
3752	" " "	Farmer's New Method..	Mt. Airy.....
3706	" " "	Fish Mixture.....	Baltimore .....
3761	" " "	P. & B. Special Fertilizer	Baltimore.....
3687	" " "	Gold Eagle.....	Baltimore.....
3742	" " "	Potato Fertilizer.....	Laurel.....
3859	" " "	Sea Fowl Guano.....	Mt. Airy.....
3759	" " "	Pure Fine Ground Animal Bone.	Silver Spring.....
3751	" " "	Soluble Bone Phosphate and Potash.	Mt. Airy..... ...
3823	" " "	Special Mixture.....	Smithsburg .....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3786	1.39	2	3.45	4	2.53	11.33	12	13.86	....	$22.74	$24.40
3710	4.88	.....	....	.....	.....	....	.....	21.83	.....	27.92	.....
3846	2.72	2½	3.69	3¾	.77	10.71	10	11.48	11	25.16	23.35
3762	2.58	2½	2.31	2½	2.12	10.91	8	13.03	11	24.41	21.40
3807	3.02	2¾	3.53	2¾	1.75	13.18	10	14.93	.....	29.46	23.00
3763	1.77	1.40	2.84	2½	3.36	7.50	8	10.86	10	19.17	17.50
3861	3.92	3½	5.04	4½	2.81	8.60	7	11.41	10	29.62	25.20
3730	2.20	2½	2.51	2½	2.33	6.45	6	8.78	.....	18.25	17.20
3671	2.80	3	3.49	3	2.58	6.58	8	9.16	.....	21.34	21.60
3658	1.66	1	2.57	2	3.21	10.05	10	13.26	11	21.60	17.60
3659	2.50	2½	....	.....	2.60	11.68	10	14.28	12	23.08	20.70
3657	.....	.....	....	.....	1.01	14.31	14	15.32	15	14.31	14.00
3752	2.60	2½	....	.....	2.48	10.88	8	13.36	9	22.35	17.70
3706	2.39	2	2.05	2	1.35	10.07	8	11.42	10	22.11	18.80
3761	.....	.....	3.18	3½	1.10	10.31	9	11.41	10	13.93	12.90
3687	3.99	3½	5.19	5	2.27	7.78	6	10.05	7	27.86	23.30
3742	2.50	2½	4.11	4	2.17	10.23	8	12.40	9½	25.19	22.00
3859	3.02	2.90	2.05	2	2.91	8.05	8	10.96	9¾	22.58	21.30
3759	7.30	4½	.....	.....	.....	.....	.....	19.08	20½	32.24	.....
3751	.....	.....	2 12	2	1.25	10.73	10	11.98	12	13.35	12.80
3823	1.11	1	1.27	1	2.43	10.50	8	12.93	10	18.66	14.80

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3678	Detrick Fertilizer & Chemical Co , Baltimore, Md..	Vegetator.....	Baltimore.....
3922	L. F. Detrick, Baltimore, Md.	Bone and Potash Mixture	Baltimore..... ....
3877	" " "	K. K. K. Kangaroo Komplete Kompound.	Baltimore.....
3781	" " "	Orchilla Guano	Leslie.....
3716	" " "	Pure Dis. Animal Bone.	Baltimore..... ...
3853	" " "	Silver Gray A. A. Phosphate.	Baltimore.....
3764	" " "	Sockless and Shoeless ..	Baltimore.....
3933	" " "	XXTRA. Acid Phos....	Baltimore.....
3747	J. W. Dorsey, Ellicott City, Md.	Ammoniated Phosphate.	Ellicott City.....
3863	Dudley & Carpenter, Baltimore, Md	CaliforniaTobacco Compound.	Baltimore..... ...
3866	" " "	Soluble Bone Phosphate.	Baltimore.....
3826	D. Englar, Jr. Medford, Md.	No. 3 Bone Phosphate...	Medford.....
3829	Englar & Rinehart, Linwood, Md.	No. 2 Ammoniated Bone Phosphate.	Linwood.....
3822	Essex Fertilizer Co., Newark, N. J	Success Fertilizer.....	Chewsville.....
3776	Eureka Fertilizer Co., Perryville, Md.	Alkaline Bone and Potash.	Leslie.....
3792	" " "	Bone Meal.....	Rising Sun.....
3784	" " "	Corn and Potato Special.	Perryville.....
3777	" " "	Farmer's Favorite Bone Phosphate.	Leslie..... ....
3789	" " "	Fish Rock and Potash...	Rising Sun..... ...
3790	" " "	Grain and Grass Mixture	Rising Sun.....
3783	" " "	Imperial Bone Phosphate	Perryville.....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3678	2.55	2½	1.61	1	2.54	11.01	10	13.55	12	$23.99	$21.70
3922	.....	.. ....	2.52	2¼	1.98	11.96	10	13.94	13	15.27	13.45
3877	2.29	2	3.13	3	2.96	9.93	8	12.89	.....	23.70	18.60
3781	.....	.....	.....	.....	12.11	4.80	.....	16.91	14	9.64	8.40
3716	2.56	2½	....	.....	2.77	10.90	10½	13.67	12	22.42	21.30
3853	2.22	2	1.37	1	3.32	9.44	8	12.76	10	21.35	17.80
3764	1.31	1¼	1.32	1¼	2.87	9.42	8	12.29	11	18.27	21.40
3933	.....	.....	.....	.....	1.03	14.65	14	15.68	14¾	14.65	14.00
3747	1.50	1½	1.91	1½	1.08	9.29	8	10.37	9½	18.24	16.50
3863	3.79	4	2.52	2	1.22	9.69	7	10.91	8	26.25	23 00
3866	2.25	2	1.28	1¼	1.67	9.64	9	11.31	.....	21.60	18.05
3826	1.71	1	2.69	2¼	1.93	9.37	5	11.30	.....	20.22	11.25
3829	.67	1.80	2.35	1.83	2.37	10.34	11.99	12.71	.....	18.19	21.62
3822	1.67	1½	2.32	2	2.02	10.58	9½	12.60	11½	21.24	19.10
3776	.....	.....	1.31	2	2.91	11.51	11	14.42	12	13.98	13.40
3792	3.33	3	.....	.....	.....	.....	.....	26.50	25	33.18	.....
3784	1.02	1	3.73	3	2.50	10.66	9	13.16	11	21.08	18.00
3777	1.79	2	2.03	2	2.54	9.59	10	12.13	12	20.43	20.60
3789	.50	¼	1.19	½	3.06	11.36	7	14.42	9	17.16	10.85
3790	1.13	1	1.74	2	4.02	11.07	9	15.09	10	20.83	16.40
3783	1.34	1	2.61	1	3.13	10.08	9	13.21	10	20.60	15.4o

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and address of Manufacturer	Name of Fertilizer.	Place of Sampling.
3778	Eureka Fertilizer Co., Perryville Md.	Potato & Vegetable Fertilizer.	Leslie.....
3779	" " "	P. & P. Super Phosphate	Leslie.....
3785	" " "	Pure Fine Raw Bone....	Perryville.....
3842	Farmer's Fertilizer Co., Westminster, Md.	No. 2 Bone Phosphate..	Westminster.....
3840	" " "	No. 3. Bone Phosphate....	Westminster.....
3841	" " "	XX. Bone Phosphate....	Westminster.....
3705	W. S. Farmer & Co., Baltimore, Md.	B. & P. Fertilizer.....	Baltimore.....
3729	" " "	Cooperative Phosphate.	Cambridge .....
3646	" " "	Dissolved S. C. Bone....	Baltimore .....
3782	" " "	Ground Bone.....	Aberdeen.....
3645	" " "	Harvest Queen Phosphate.	Baltimore.....
3718	" " "	No. 1. Potato Manure....	Baltimore.....
3868	" " "	Special Tobacco & Potato Guano.	Baltimore.....
3651	" " "	Standard Phosphate....	Baltimore.....
3760	Farmers & Planters Co., Salisbury, Md.	Truckers'Mixture.....	Baltimore.....
3838	N. I. Gorsuch & Son, Westminster, Md.	Westminster Dissolved Raw Bone Phosphate.	Westminster.....
3839	" " "	Westminster No. 3. Bone XXXX.	Westminster.....
3819	Great Eastern Fertilizer Co., New York. N. Y.	Pure Ground Bone.....	Hagerstown.....
3831	Griffith & Boyd, Baltimore, Md.	Ammoniated Soluble Bone.	Union Bridge.....
3700	" " "	Cereal Bone Plant Food	Baltimore.....
3745	" " "	Genuine German Kainit	Ellicott City.....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3778	1.62	2	3.37	4	3.17	9.82	8	12.99	10	$21.91	$20.80
3779	.....	.....	.....	.....	3.37	12.81	14	16.18	15	12.81	14.00
3785	4.61	4	.....	.....	.....	.....	.....	22.87	22	28.38	.....
3842	2.04	2	3.31	2½	1.63	8.37	9	9.99	10	20.45	19 90
3840	1.82	1¾	2.23	2½	1.65	9.62	9	11.27	11	20.32	19.75
3841	1.11	1	3.07	3	1.40	9.76	9	11.16	10	18.95	17.40
3705	.....	.....	1.93	2½	1.14	11.97	10	13.11	11	14.35	12.90
3729	2.26	2¼	3.15	3	1.53	10.06	9	11.59	10	22.92	21.15
3646	.....	.....	.....	.....	1.40	14.67	14	16.07	15½	14.67	14.00
3782	3.26	3	.....	.....	.....	.....	.....	17.47	15	22.02	.....
3645	1.55	1½	3.01	2½	1.18	10.04	10	11.22	11½	20.38	19.90
3718	4.05	4½	8.49	7	1.55	9.71	8	11.26	9	33.22	30.70
3868	3.12	3	3.00	3	2.32	9.21	8	11.53	9	24.80	22.20
3651	2.70	2.85	2.64	2½	1.58	10.73	10	12.31	11½	24.57	23 95
3760	3.02	3	3.99	3	1.64	9.88	9	11.52	.....	25.89	22.80
3838	1.75	1.40	2.45	2¼	1.83	7.77	7	9.60	8	18.12	15.45
3839	.51	¼	2.41	1½	1.97	7.64	8	9.61	9	14.29	12.45
3819	2.00	2	.....	.....	.....	.....	.....	32.69	22	32.77	.....
3831	1.04	1	2.64	1½	1.81	7.21	7	9.01	8	15.50	13.50
3700	1.25	1	2.42	2	2.35	8.23	8	10.58	9	17.46	15.80
3745	.....	.....	13.71	12	.....	.....	.....	.....	.....	13.71	12.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3767	Griffith & Boyd, Baltimore, Md.	Guinea Guano.....	Baltimore .....
3714	" " "	H. G. Acid Phosphate..	Baltimore... . ....
3808	" " "	Peerless Fertilizer.....	White Hall.....
3744	" " "	Pure Fine Ground Bone Meal.	Ellicott City.....
3715	" " "	Spring Crop Grower....	Baltimore.....
3746	" " "	Valley Fertilizer.....	Ellicott City.....
3712	Griffith & Lytle, Baltimore, Md.	Ammoniated Soluble Bone.	Baltimore.....
3711	" " "	Ammoniated Soluble Bone Phosphate.	Baltimore..... ...
3667	" " "	Bone Phosphate	Baltimore.....
3668	" " "	Standard Bone Phosphate.	Baltimore.....
3708	Griffith, Turner & Co., Baltimore, Md.	Ammoniated Alkaline Plant Food.	Baltimore.....
3851	" " "	Ammoniated Butcher's Bone Phosphate.	Glyndon.....
3850	" " "	H. G. Acid Phosphate...	Glyndon.....
3852	" " "	Soluble Bone Phosphate.	Glyndon.....
3702	" " "	Soft Ground Bone.....	Baltimore.....
3815	Wm. R. Griffith, Baltimore, Md.	Slaughter House [G.] Phosphate.	Baltimore.....
3833	Hanover Bone Fert. Co., Hanover, Pa.	Hanover Excelsior Combine.	Westminster.....
3805	" " "	Hanover Pure Bone Meal.	Belair.....
3834	" " "	Pure Bone Meal.....	Westminster .....
3719	Hanway & Keen, Belair, Md.	Special Mixture.....	Baltimore... .....
3780	S. M. Hess & Bro., Reading, Pa.	Keystone Bone Phos....	Leslie.....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3767	3.70	4	2.79	2	1.81	8.72	8½	10.53	15	$25.45	$28.10
3714	....	.....	.....		2.40	12.96	14	15.36	15	12.96	14.00
3808	..	.....	2.85	2	1.37	8.49	8	9.86	9	11.88	10.40
3744	5.46	4	.....		....	.....		17.55	22	25.52	.....
3715	2.25	2	5.49	4½	1.79	7.12	7	8.91	8	21.85	19.50
3746	.95	½	2.16	2	1.27	8.26	8	9.53	9	15.68	13.70
3712	1.32	1	2.62	2	1.96	7.65	8	9.61	10	16.94	15.80
3711	1.37	1	2.49	1½	2.06	7.66	7	9.72	8	17.03	13.50
3667	1.33	1	2.35	1½	2.64	8.21	7	10.85	8	17.77	13.50
3668	1.77	2	2.31	1½	3.23	9.34	9	12.57	10	20.76	18.90
3708	1.21	1	2.04	1½	1 55	7.19	6½	8.74	7½	15.23	12.90
3851	1.04	1½	2.35	1½	1.91	7.90	9	9.81	10	16.10	17.40
3850	.....	.....	.....	....	1.46	12.39	14	13.85	15	12.39	14.00
3852	.....	.....	1.96	1½	1.60	7.98	9	9.58	10	10.58	10.90
3702	3.93	4½	.....	.....	9 43	8.58	.....	18.01	16	27.75	23.16
3815	4.67	2	2.54	2¼	1.81	8.44	5	10.25	5½	27.77	14.55
3833	2.09	2	2.75	3	1.58	9.98	9	11.56	10	21.95	20.40
3805	4.70	4	.....	.....	.....	....	.. ....	21.35	23	28.00	.....
3834	4.76	4	.....	.....	. ....	.....	.....	19.68	23	27.17	.....
3719	1.47	1	2.30	2	1.28	9.26	9	10.54	11	18.59	17.00
3780	1.24	1	1.10	1	1 33	9.00	9	10.33	11	16.42	16.00

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3741	S. M. Hess & Bro., Reading, Pa.	Potato & Truck Manure.	Millington .....
3643	J. Horner, Jr. & Co., Baltimore, Md.	Ammoniated Raw Bone Super Phosphate.	Baltimore.....
3652	" " "	Dis. Slaughter House Bone Dust.	Baltimore.....
3637	" " "	The Cultivator.....	Baltimore ... .
3644	" " "	Slaughter House Bone Dust.	Baltimore .....
3774	Hubbard & Co., Baltimore, Md.	Buyer's Special Mixture.	North East.....
3750	" " "	Columbia Gem Phos....	Mt. Airy. .....
3694	" " "	Farmer's IXL Super Phosphate.	Baltimore.....
3704	" " "	H. G. Soluble S. C. Phosphate.	Baltimore.....
3749	" " "	Oriental Phosphate for Wheat & Grass.	Mt. Airy.....
3693	" " "	Pure Raw Bone.....	Baltimore.....
3748	" " "	Soluble Bone & Potash..	Mt. Airy.....
3814	" " "	Trucker's Seven Per Cent. Royal Seal.	Baltimore.....
3663	M. P. Hubbard & Co., Baltimore, Md.	Celebrated Bone Super Phosphate.	Baltimore... .....
3766	" " "	Farmer's Old Economy.	Baltimore.....
3849	" " "	Farmer's Old Economy.	Glen Morris.....
3636	" " "	Farmer's Acme Fert....	Baltimore.....
3611	" " "	Havana Special.....	Hollywood.....
3673	" " "	H. G. Soluble S. C. Phosphate.	Baltimore.....
3728	" " "	Soluble Bone & Potash..	Baltimore.....
3812	T. R. Hubbard & Son. Chestertown, Md.	American Standard Bone Super Phosphate.	Baltimore..... ...

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3741	2.38	2	6.08	6	1.05	8.27	8	9.32	....	$23.77	$21.60
3643	2.58	2½	3.19	2½	2.30	8.34	8	10.64	12	22.32	22.00
3652	3.11	2½	....	....	3.30	13.31	12	16.61	15	27.28	23.70
3637	2.50	2½	2.88	2½	2.08	7.66	7	9.74	9	20.81	19.60
3644	6.88	6	....	....	....	....	....	17.43	20	30.50	....
3774	3.49	....	3.74	....	1.50	8.18	....	9.68	....	24.94	....
3750	.91	½	1.89	1½	1.14	8.82	8	9.96	10	15.88	13.80
3694	2.03	2	1.86	1⅞	1.14	9.15	7	10.29	8½	19.61	17.05
3704	....	....	....	....	1.16	14.38	14	15.54	....	14.38	14.00
3749	1.31	1	1.58	1½	1.14	9.39	8	10.53	10	17.46	15.30
3693	4.86	4	....	....	....	....	....	25.08	23	35.98	....
3748	....	....	2.02	2	.72	10.61	10	11.33	11	12.92	12.60
3814	6.36	7	3.65	4	1.48	7.93	5	8.41	....	33.14	31.00
3663	2.59	2½	2.31	2	1.39	9.88	9	11.27	10½	22.78	21.20
3766	1.21	½	1.82	1½	1.91	8.95	8	10.86	10	17.34	13.80
3849	.89	½	1.60	1½	2.12	8.10	8	10.22	10	15.26	13.80
3636	2.01	2	2.44	2	1.35	7.87	7	9.21	8½	18.72	17.30
3611	2.36	2½	3.71	2½	1.17	9.76	9	10.93	10½	23.21	21.70
3673	....	....	....	....	.90	14.40	14	15.30	....	14.40	14.00
3728	....	....	2.01	2	.90	11.22	9	12.12	11	13.59	11.80
3812	2.78	2	3.80	3	2.07	10.35	8	12.42	10	25.80	19.80

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3740	T. R. Hubbard & Son, Chestertown, Md.	Fruit Grower O. B. Phosphate.	Chestertown.....
3737	" " "	Imperial Compound Phosphate.	Chestertown.....
3738	" " "	Our A. A. Bone Super Phosphate.	Chestertown.....
3674	" " "	Our Peerless Fertilizer..	Baltimore.....
3675	" " "	Special Mixture.....	Baltimore.....
3739	" " "	Victor Phosphate.....	Chestertown.....
3809	J. C. Hunter, White Hall, Md	Ammoniated Bone Phosphate.	White Hall.....
3666	S. L. Lamberd & Co., Baltimore, Md.	Bos. Fertilizer.....	Baltimore.....
3768	Lauer Bros., York, Pa.	New Mixture.....	Baltimore..... ....
3684	Lazaretto Guano Co., Baltimore, Md.	Acid Phosphate.....	Baltimore.....
3813	" " " "	Alkaline Phosphate.....	Baltimore.....
3847	" " " "	Ammoniated Bone Phosphate.	Hampstead .....
3757	" " " "	Ammoniated Bone Phosphate.	Washington Grove.
3827	" " " "	Early Trucker.....	Medford.....
3828	" " " "	Pure Dis. Animal Bone..	Medford.....
3756	" " " "	Pure Dis. S. C. Bone...	Washington Grove.
3816	" " " "	Retriever Animal Bone Fertilizer.	Baltimore.....
3772	Lister Agrl. Chem. Works, Newark, N. J.	Animal Bone & Potash..	North East.....
3848	" " "	Animal Bone & Potash No. 2.	Fairview.....
3865	" " "	Ammoniated Dis. Bone Phosphate.	Baltimore.....
3743	" " "	Celebrated Ground Bone Acidulated.	Laurel.....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3740	.82	½	6.87	6	3.85	4.07	.....	7.92	6	$15.52	$11.10
3737	1.54	1	3.73	2½	3.15	8.67	9	11.82	11	20.77	17.50
3738	2.53	1¼	3.57	3	2.15	9.70	9	11.85	.....	24.09	17.55
3674	1.48	1¼	4.14	4	1.49	7.06	9	8.55	.....	17.94	18.55
3675	.....	.....	.68	.....	1.25	9.09	.....	10.34	.....	10.27	.....
3739	.....	.....	3.47	1½	1.80	11.11	7	12.91	.....	15.30	8 50
3809	1.03	1	2.35	2	1.40	8.73	9	10.13	10	16.76	16.40
3666	2.01	2	4.68	4½	1.79	7.01	7	8.80	8	20.19	19.50
3768	1.51	1½	.39	.36	1.35	2.16	3 04	3.51	5.71	7.92	10.11
3684	.....	.....	.....	.....	1.16	14.43	14	15.59	.....	14.43	14.00
3813	.....	.....	3.98	3	.79	13.03	12	13.82	.....	17.32	15.00
3847	1.05	1	2.11	2	1.65	8.47	9	10.12	10	16.41	16.40
3757	1.08	1	2.07	2	1.44	8.83	9	10.27	10	16.77	16.40
3827	4.60	5	5.24	5	1.55	8.71	7	10.26	8	30.42	29.00
3828	2.65	2½	.....	.....	5.01	10.59	12	15.60	.....	23.77	21.90
3756	.....	.....	.....	.....	.87	14.96	14	15.83	.....	14.96	14.00
3816	2.47	2¼	5.28	4	2.66	9.82	8	12.48	12½	26.07	23.05
3772	.....	.....	4.84	5	1.20	10.14	9	11.34	10	15.46	14.40
3848	....	.....	3.15	3	1.06	10.84	10	11.90	11	14.41	13.40
3865	2.21	2.20	1 93	1½	2.37	11.90	9	14.27	11	24.26	20.10
3743	4.26	3¼	.....	.....	5.66	7.98	.....	13.64	12	25.76	16.95

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3638	Lister Agrl. Chem. Works, Newark, N. J.	Harvest Queen.....	Baltimore.....
3771	" " "	Increase Crescent Bone Dust.	North East.....
3650	" " "	Potato Manure.....	Baltimore.....
3773	" " "	Pure Raw Bone Meal....	North East.....
3639	" " "	Special Potato Fertilizer.	Baltimore.....
3635	" " "	Standard Pure Bone Phosphate.	Baltimore.....
3734	T. H. Longfellow, Greensboro, Md.	Farmer's Delight, No. 1. Raw Bone Phos.	Greensboro.....
3733	" " "	Farmer's Delight, No. 2	Greensboro.....
3732	" " "	Farmer's Delight, No. 1. for Truck.	Greensboro.....
3661	Mapes Formula & Peruvian Guano Co., N. Y., N. Y.	A. Brand Manure.....	Baltimore.....
3653	" " "	Economical Potato Manure.	Baltimore.....
3820	Md. Fert. & Manfg. Co., Baltimore, Md.	Ammoniated Fertilizer, O K.	Chewsville.....
3821	" " " "	Dis. S. C. Bone.....	Chewsville.....
3825	" " " "	Globe Complete Manure.	Smithsburg .. ....
3830	" " " "	Pure Dis. Animal Bone..	Linwood.....
3824	" " " "	Sangston's Cereal and Plant Food	Smithsburg.....
3709	Md. Grange Agency, Baltimore, Md.	Pure Bone Meal.....	Baltimore.....
3679	F. Maynard, Baltimore,	Trucker's Pride.....	Baltimore.....
3843	F. Mehring, Bruceville, Md	Acid Phosphate.....	Carrollton.....
3845	" " "	Dis. Raw Bone.....	Carrollton.....
3844	" " "	$26 Phosphate.....	Carrollton.....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found	Available.		TOTAL.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3638	1.74	1½	2.22	2	1.77	9.77	9½	11.54	11½	$20.22	$19.10
3771	3.17	2¾	.....	.....	8.77	7.52	11	15.29	.....	23.79	21.45
3650	5.05	4½	7.60	7	1.34	8.11	7½	9.45	8½	33.29	30.10
3773	3.51	3¼	.....	.....	.....	.....	.....	26.22	23	30.29	.....
3639	2.26	2	3.36	3	2.18	10.47	8	12.60	9	23.98	19.20
3635	3.17	2.85	1.92	1½	2.05	11.53	10	13.58	12	26.49	23.25
3734	1.33	1	1.14	1	2.30	7.32	7	9.62	8	15.29	13 00
3733	.67	½	1.36	1	.92	8.00	7	8.92	8	13.52	11.50
3732	1.43	1	2.16	2	1.90	9.07	7	10.97	8	18.90	14.00
3661	3.79	3	3.12	2½	1.90	11.37	10	13.27	12	29.27	24 70
3653	4.48	4	9.08	8	1.44	5.28	4	6.72	6	31.54	26 00
3820	1.22	1	2.08	2	1.80	9.39	8	11.19	9	18.09	15.20
3821	.....	.....	.....	.....	1.84	14.10	14	15.94	14½	14.10	14.00
3825	2.11	2	1.36	1½	3.88	9.06	9	12.94	10	20.89	18.90
3830	2.97	2½	.....	.....	3.20	12.60	12	16.10	.....	25.95	21 90
3824	1.44	1¼	2.07	2¼	3.39	10.68	10	14.07	11	21.24	18 60
3709	4.55	4	.....	.....	.....	.....	.....	24.13	20	32.53	.....
3679	4.54	5	2.54	2½	1.15	11.14	5	12.29	7	30.22	24.70
3843	....	.....	.....	.....	3.40	15.08	13	18.48	.....	15.08	13.00
3845	1.53	1	.....	.....	1.53	18.74	14	20.37	.....	28.00	19.80
3844	1.37	1	.86	¾	3 80	12.11	9	15.91	.....	21.78	14.55

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3690	Miller Fertilizer Co, Baltimore, Md.	Clinch Phosphate.....	Baltimore.....
3640	" " "	Dis. Raw Bone.....	Baltimore.....
3689	" " "	Harvest Queen.....	Baltimore.....
3726	" " "	Hustler Phosphate.....	Baltimore.....
3698	" " "	No. 1 Potato Phosphate.	Baltimore.....
3699	" " "	No 2 Potato Fertilizer ..	Baltimore.....
3691	" " "	S. C. Bone	Baltimore.....
3641	" " "	Special Potato Grower..	Baltimore.. .....
3656	" " "	Special Potato Fertilizer.	Baltimore .....
3662	" " "	Standard Super Phosphate of Lime.	Baltimore.....
3688	" " "	Special Tomato Grower.	Baltimore.....
3682	W. H. Moore & Co., Baltimore, Md.	Special for Tobacco Beds	Baltimore.....
3818	Nelson Morris & Co., Chicago Ill.	Big Two Pure Bone Meal.	Hagerstown.....
3601	Morton Mfg. Co., Washington, D. C.	Tankage	Colesville.....
3810	G. R. Mowell, Glencoe, Md.	Dis. S. C. Rock.....	Glencoe.....
3811	" " "	Standard Bone Phos.....	Glencoe.....
3920	Natural Plant Food Co., Washington. D. C.	Natural Plant Food.....	Baltimore.....
3906	J. B. Nichols & Son, Baltimore. Md.	Farmer's Friend Guano.	Baltimore.....
3875	Nickerson Fertilizer Co., Easton.	H. G. Vegetable Guano.	Baltimore.....
3977	" " "	Linthicum's Special Mixture.	Ellicott City.....
3959	" " "	Special Mixture.....	Easton.....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3690	1.43	1	1.94	1½	1.09	8.11	7	9.20	9	$16.61	$14.10
3640	2.61	2½	.....	.....	3.74	10.82	11	14.56	14	23.05	22.50
3689	1.60	1¼	2.63	2¼	1.14	11.01	10	12.15	11½	21.32	18.90
3726	1.56	1	2.43	2¼	.81	10.14	9	10.95	10	19.77	16.65
3698	5.08	4½	4.74	7	.64	8.61	8	9.25	.....	30.69	30.10
3699	5.10	2	6.64	4	.44	8.61	8	9.05	9	32.53	20.20
3691	.....	.....	.....	.....	1.82	14.23	14	16.05	.....	14.23	14.00
3641	3.02	3	3.18	3	.47	9.77	8	10.24	9½	24.24	22.50
3656	1.19	1	5.62	5	1.19	8.21	7	9.40	9	19.75	17.60
3662	2.90	2.85	2.43	2¼	.88	10.43	10	11.31	11½	24.18	23.70
3688	3.31	3	3.46	3	.59	9.10	8	9.69	9½	24.66	22.50
3682	7.01	7	2.47	2	1.28	6.44	6	7.72	.....	32.00	30.20
3818	1.77	2½	.....	.....	.....	.....	.....	31.10	28	33.09	.....
3601	6.86	.....	.....	.....	.....	.....	.....	12.97	.....	26.82	.....
3810	.....	.....	.....	.....	1.42	12.98	14	14.40	15	12.98	14.00
3811	1.61	2	2.37	2	2.56	10.21	10	12.77	11	20.99	20.60
3920	.....	.....	.....	1	17.09	3.26	.....	20.35	21.60	10.10	9.64
3906	4.26	4	4.59	4	1.11	7.73	7	8.84	.....	27.32	24.40
3875	2.32	6	3.50	4	2.12	8.13	4	10.25	6	21.47	27.40
3977	1.28	½	.....	.....	2.57	7.23	8	9.80	9	14.09	14.70
3959	.68	½	1.89	3	2.78	8.11	8	10.89	9	15.34	14.70

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3901	Nickerson Fertilizer Co., Easton.	Truck Guano	Baltimore
3944	North Western Fert. Co., Chicago, Ill.	H. S. B. Farmer's High Grade.	Baltimore
3967	" " " "	H. S. B. Prairie Phos	Laurel
3945	" " " "	H. S. B. Pure Ground Bone.	Baltimore
3924	G. Ober & Sons Co., Baltimore, Md.	Avondale Ammoniated Dis. Bone.	Baltimore
3923	" " " "	Dis. Bone Phosphate	Baltimore
3947	" " " "	Dis. Bone Phosphate and Potash.	Baltimore
3905	" " " "	Farmer's Standard Ammoniated Phosphate.	Baltimore
3992	" " " "	Robinson's Vegetable Fertilizer.	Baltimore
3881	" " " "	Special Ammoniated Dis. Bone.	Baltimore
3893	Patapsco Guano Co., Baltimore, Md.	Ammoniated Corn Fertilizer.	Baltimore
4004	" " "	Baltimore Soluble Phosphate.	Cockeysville
3892	" " "	Coon Brand Guano	Baltimore
3909	" " "	Early Truck Phosphate.	Baltimore
3894	" " "	Grange Mixture	Baltimore
3885	" " "	Pure Dis. S. C. Bone	Baltimore
4033	" " "	Tobacco Fertilizer	Baltimore
3731	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Caroline Mixture	Hillsboro
3934	" " "	Insula Guano	Baltimore
3943	" " "	Mt. Airy Garden and Truck Fertilizer.	Baltimore
3932	" " "	No. 1 Raw Bone Meal	Baltimore

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3901	1.36	2	3.09	3	2.86	8.52	10	11.48	.....	$19.11	$21.00
3944	2.83	2	....	.....	2.95	8.52	9	11.57	10	20.48	17.40
3967	3.04	2	....	.....	4.71	7.06	6	11.77	9	20.43	15.00
3945	4.40	2½	....	.....	.....	.....		23.20	20½	31.74	.....
3924	3.25	2½	2.36	1½	4.01	8.75	8½	12.76	11¼	25.02	20 10
3923	.....	.....	...	.....	1.25	15.82	14	17.07	16½	15.82	14.00
3947	.....	.....	2.33	2	1.16	13.26	10	14.42	12	16.05	12 80
3905	2.85	2	2.54	1½	1.35	10.35	8	11.70	10¾	24.32	18.75
3992	2.10	2	2.43	2	2.06	.0.66	9	12.72	11½	22.76	20.30
3881	2.03	1½	3.15	1½	1.34	10.64	8	11.98	10½	22.89	17.10
3893	1.81	1½	2.38	2	2.80	7.90	9	10.70	11	18.97	18.50
4004	.....	.....	2.06	2	.88	11.52	11	12.40	12	13.93	13.40
3892	1.21	1	3.24	3	1.86	9.23	9	11.09	10	19.07	17.40
3909	4.49	5	7.36	5	1 36	6.23	7	7.59	8	29.13	29.00
3894	2.28	2	2.09	2	2 01	10.44	10	12.44	12½	22.67	21.50
3885	.....	.....	....	.....	1.33	14.23	14	15.56	.....	14.23	14.00
4033	2.83	3	3.49	3	2 45	9.32	9	11.77	12	24.66	24.60
3731	1.09	1	2.49	2	1 04	8.51	8	9.55	9	14.59	15.20
3934	.55	½	2.34	2	.87	5.71	5	6.58	7	11.37	10.70
3943	4.05	4	3.57	3	1.15	8.87	8	9.92	.....	27.05	24 60
3932	4.03	3½	.....	.....	....	.....		14.40	18½	21.54	. ...

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and address of Manufacturer	Name of Fertilizer.	Place of Sampling.
3925	Piedmont-Mt. Airy Guano Co., Baltimore, Md.	Piedmont Dis. Bone Phos. Potash Goods.	Baltimore.....
4006	" " "	Piedmont Guano for Tobacco.	Baltimore.....
3929	" " "	Piedmont Royal Ammoniated Bone & Potash.	Baltimore.....
3878	" " "	Piedmont Pure Raw Bone Mixture.	Baltimore.....
3685	" " "	Piedmont Potato Producer.	Baltimore.....
3681	" " "	S. C. Bone Phosphate...	Baltimore.....
3928	" " "	Special Truck Fertilizer for Tomatoes, etc.	Baltimore.....
3902	William Pleasants, Baltimore. Md.	H. G. Phosphate or Dis. S. C. Rock.	Baltimore .....
3879	R. H. Pollock, Baltimore, Md.	Accomac Trucker.....	Baltimore... .....
3962	" " "	Ammoniated Bone Phosphate.	Denton .....
3896	" " "	Dis. S. C. Bone.....	Baltimore.....
3904	" " "	Special Potato & Tobacco Fertilizer.	Baltimore.....
3916	" " "	Superior Corn & Tomato Fertilizer.	Baltimore.....
3895	" " "	Victor Bone Phosphate..	Baltimore.....
3946	Powell Fert. & Chem. Co., Baltimore, Md.	Red Bag.....	Baltimore.....
3989	Ramsburg Fertilizer Co., Frederick, Md.	Alkaline Phospho-Potassium.	Frederick.... .....
3932	" " "	Corn & Potato Fertilizer	Mt. Airy.....
3988	" " "	Dis. Animal Bone.....	Frederick.....
3987	" " "	Dis. Bone Superphosphate.	Frederick.....
3984	" " "	Excelsior Plant Food....	Mt. Airy.....
3603	" " "	Excelsior Plant Food...	Kemptown.....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed	Found.	Guaranteed.		
3925	.....	.....	1.18	1	.87	10.39	10½	11.26	12½	$11.92	$11.90
4006	2.22	2½	4.66	3	.95	8.51	8	9.46	9	22.09	20.70
3929	1.41	1.30	3.09	3	.73	6.47	6	7.20	8	15.52	15.30
3878	1.70	1	1.23	1	3.00	7.02	7	10.02	11	16.55	14.80
3685	3.06	3	7.28	6	1.01	6.21	5	7.22	7	24.52	22.20
3681	.....	.....	.....	.....	1.60	12.44	13	14.04	14	12.44	13.00
3928	2.02	2	2.32	2	1.42	9.60	9	11.02	10	20.75	19.40
3902	.....	.....	.....	.....	.76	15.26	14	16.02	15	15.26	14.00
3879	5.23	5	5.29	5	1.58	8.63	9	10.21	10	32.29	31.40
3962	2.11	2	2.60	2	1.66	7.68	10	9.34	11	19.15	20.60
3896	.....	.....	.....	.....	1.31	13.51	14	14.82	16	13.51	14.00
3904	2.58	2½	4.85	4	1.20	9.19	9	10.39	10	24.33	22.90
3916	1.74	1	2.52	2	1.80	9.58	9	11.38	10	20.32	16.40
3895	.....	.....	1.25	1	.88	9.15	9	10.03	10	10.75	10.40
3946	1.07	2	.87	2	1.22	9.59	8	10.81	10	16.32	18.80
3989	1.09	¾	.99	2	3.37	14.31	10	17.68	14	23.45	18.65
3982	1.24	1	2.24	2	2.93	10.78	8	13.71	10	20.65	15.80
3988	2.11	2	.....	.....	6.33	12.53	10	18.86	13	25.17	19.80
3987	.....	.....	.....	.....	4.72	14.20	14	18.92	16	14.20	14.00
3984	2.24	2	1.30	1	3.72	9.36	9	13.08	11	21.48	19.00
3603	2.42	2	1.52	1	3.72	10.08	9	13.80	10	23.11	18.40

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
4030	Ramsburg Fertilizer Co, Frederick, Md	Excelsior Plant Food....	Frederick.....
3983	" " "	Excelsior Tobacco Compound.	Mt. Airy.....
3874	" " "	Excelsior Tobacco Compound.	Lewisdale.....
3980	" " "	Old Va Compound.....	Sykesville.....
3990	" " "	Pure Bone Meal.....	Silver Spring.....
3888	Rasin Fertilizer Co., Baltimore, Md.	Acid Phosphate.....	Baltimore.....
4029	" " "	Ammoniated Super Phos.	Germantown.....
3921	" " "	Bone & Potash Fertilizer.	Baltimore.....
3968	" " "	Empire Guano.....	Laurel.....
3910	" " "	Truck Guano.....	Baltimore .....
4003	Henry Reckord Mfg. Co., Belair, Md.	Animal Bone Phosphate.	Belair.....
3937	" " "	Dis. S C. Bone.....	Baltimore.....
3940	" " "	Fine Ground Bone.....	Baltimore.....
3938	" " "	Raw Bone.....	Baltimore.....
3936	" " "	Special Compound.....	Baltimore.....
4018	Rinehart & Clemson, Union Bridge, Md.	No. 2 Bone Phosphate...	Union Bridge.....
3884	Isaac Robinson, Baltimore. Md.	H. G. Sol. Phosphate....	Baltimore.....
3886	" " "	Pure Bone Meal.....	Baltimore..... ....
4027	" " "	Pure Raw Bone.....	Baltimore.....
3604	" " "	Potashed Bone.....	Cambria.....
3939	" " "	Potashed Bone.....	Baltimore..... ...

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
4030	2.07	2	1.09	1	3.57	10.65	9	14.22	11	$22.22	$19.00
3983	2.86	2	2.18	2	2.24	10.56	8	12.80	10	24.77	17.60
3874	4.02	2	4.40	2	1.63	10.42	8	12.05	10	29.94	17.60
3980	1.53	1½	1.74	2.10	3.71	10.51	9.30	14.22	11½	21.17	19.08
3990	2.96	3½	.....	.....	.....	.....	.....	27.51	23	33.45	.....
3888	.....	.....	.....	.....	.77	15.48	14	16.25	15	15.48	14.00
4029	1.29	1	1.16	1	1.64	12.38	8	13.02	9	20.87	14.20
3921	.....	.....	.82	1½	2.92	11.54	12	14.46	13	13.53	13.90
3968	2.76	2.43	1.83	1½	3.25	8.22	8	11.47	10	21.92	19.59
3910	4.30	4	2.54	2	1.16	9.07	7	10.23	8	27.02	23.00
4003	2.01	1½	2.25	1½	1.62	9.01	8	10.63	.....	20.06	15.60
3937	.....	.....	.....	.....	1.30	15.05	14	16.35	.....	15.05	14.00
3940	4.40	3	.....	.....	.....	.....	.....	22.41	25	30.89	.....
3938	5.11	5.29	.....	.....	.....	.....	.....	19.61	20.38	25.41	.....
3936	2.24	2.03	2.51	2.13	1.64	8.21	10.66	9.85	13.18	20.06	22.52
4018	1.37	1.56	1.94	2½	1.33	7.89	8.27	9.24	11	16.32	18.90
3884	.....	.....	.....	.....	1.21	14.65	14	15.86	.....	14.65	14.00
3886	4.28	4	.....	.....	.....	.....	.....	22.09	20	28.70	.....
4027	4.62	4	.....	.....	.....	.....	.....	22.57	23	29.66	.....
3604	.....	.....	2.26	2	1.78	11.56	10	13.34	12	14.54	12.80
3939	.....	.....	2.03	2	1.78	10.54	10	12.32	12	13.28	12.80

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3911	Isaac Robinson, Baltimore, Md.	Special Corn & Oats Phosphate.	Baltimore.....
3880	" " "	Special Potato & Tomato Phosphate.	Baltimore..... ...
3727	" " "	Standard Dis. Bone Phos	Baltimore..... ....
4022	Chas. Schaffer, Westminster, Md	Governor.....	Westminster.....
4020	" " "	High Grade Acid Phos..	Westminster.....
4023	" " "	Leader.....	Westminster.....
4019	" " "	Pure Raw Bone Meal....	Westminster.....
4021	" " "	Super "A".....	Westminster.....
3999	Scott Fertilizer Co, Elkton, Md.	Potato Fertilizer No. 2..	Elkton.....
4000	" " "	Pure Dis. Bone.....	Elkton... .....
3998	" " "	Pure Ground Bone.....	Elkton.....
3995	" " "	Standard Phosphate.. .	Elkton.....
3996	" " "	Sure Growth Compound	Elkton.....
3994	" " "	Sure Growth Super Phosphate.	Elkton.....
3997	" " "	Tip Top Soluble Bone..	Elkton.....
3993	" " "	Tip Top Soluble Bone & Potash.	Elkton.....
3976	Sharpless & Carpenter, Philadelphia, Pa.	Dis. Bone Phosphate for Potatoes.	Ellicott City.....
4002	" " "	Gilt Edge Potato Manure	Aberdeen.....
4001	" " "	No. 1 Bone Phosphate...	Aberdeen.....
3908	G. W. Sharretts & Co., Baltimore, Md.	Fish Rock & Potash....	Baltimore.....
4010	J. D. Simmons, Hagerstown, Md.	Fruit Producer.....	Hagerstown.....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed		Found.	Guaranteed.	Found.	Guaranteed.		
3911	2.20	1¾	2.74	2	1.53	7.62	7	9.15	9¾	$19.39	$17 30
3880	1.67	2	2.06	2¼	1.51	8.12	7½	9 63	10	17.73	18.75
3727	1.16	1	2.20	2	1.15	10.69	10	11.84	11½	19.21	17.90
4022	1.54	1½	2.59	2½	.82	9.73	9	10.55	.....	19.38	17.80
4020	.....	.....	.....	.....	1.34	14.44	14	15.78	18	14.44	14.00
4023	1.20	1	2.05	1½	1.48	8.75	8	10.23	.....	17.04	14.10
4019	4.79	4	.....	.....	.....	.....	.....	22.11	22	27.25	.....
4021	.92	¾	1.46	1	1.12	9.42	7½	10.54	8½	16.19	12.85
3999	2.52	2	5.04	4	1.82	8.30	8	10.12	.....	23.65	19.60
4000	2.58	2½	.....	.....	5.87	11.21	13	17.08	15	24.71	24.30
3998	4.83	4	.....	.....	.....	.....	.....	23.39	22	29.03	.....
3995	1.31	1½	2.30	2	1.04	10.72	8	11.76	.....	19.71	16.10
3996	3.50	4½	5.12	7	1.74	9.72	6	11.46	.....	28.32	27.70
3994	2.68	2	2.49	2	1.76	9.60	9	11.36	.....	23.15	18.80
3997	.....	.....	.....	.....	1.22	14.70	13	15.92	.....	14.70	13.00
3993	....	.....	2.08	2	1.25	11.89	11	13.14	.....	14.47	13.00
3976	2.06	3	1.80	5	2.71	9.08	8	11.79	.....	20.51	23.60
4002	3.63	3	6.76	6	3.01	7.27	7	10.28	.....	28.18	23.40
4001	2.50	2½	2.24	2	1.30	8.95	8½	10.25	.....	21.25	19.70
3908	.43	½	1.34	½	.73	4.97	6	5.70	.....	9.03	8.45
4010	1.30	1	6.40	7	1.41	9.60	8	11.01	.....	22.67	19.60

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
4009	J. D. Simmons, Hagerstown, Md.	Mixture for Corn.....	Hagerstown.....
3918	Slingluff & Co., Baltimore Md.	Ammoniated Bone.....	Baltimore..... ...
3969	" " "	Ammoniated Super Phosphates.	Laurel.....
3973	" " "	Alkaline Super Phos....	Ellicott City.. .....
4017	" " "	Alkaline Super Phos....	New Windsor.....
3917	" " " for Md. Grange Agency.	Agencies Favorite.....	Baltimore.....
3975	" " "	British Mixture.....	Ellicott City.....
3931	" " "	Dis. S. C. Bone.....	Baltimore.... .....
3972	" " "	Half & Half.....	Ellicott City.....
8978	" " "	Special Bone Phosphate.	Sykesville.....
4008	" " "	Special Bone Phosphate.	Cumberland.....
3899	" " "	Trucker's Favorite.....	Baltimore.....
3974	" " "	Universal Guano.....	Ellicott City.....
4013	G. W. Stocksdale, Thurmont, Md.	Ammoniated Super Phosphates.	Thurmont.....
4014	" " "	Dis. Animal Bone Phos.	Thurmont.....
4011	J. W. Stonebraker & Son, Hagerstown, Md.	Champion.....	Hagerstown.....
3887	W. H. Street & Co., Baltimore, Md.	Ammoniated Dis. Bone.	Baltimore.....
3891	" " "	Trueker's Guano.....	Baltimore.....
3889	Susquehanna Fert. Co., Baltimore, Md.	Potato Phosphate.....	Baltimore.....
4016	" " "	Pure Dissolved Bone....	Graceham....;.....
3903	" " "	Pure Ground Bone.....	Baltimore. .....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculcated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
4009	.57	½	6.85	6	4.88	10.74	14	15.62	.....	$24.38	$24.30
3918	2.55	2½	2.22	2½	1.17	10.87	9	12.04	.....	23 61	20.89
3969	1.09	1	1.28	1	1.66	10.75	8	12.41	.....	18.45	13.60
3973	.....	.....	1.50	2	1.46	10.98	10	12.44	.....	13.06	12.00
4017	....	.....	1.46	2	.98	12.30	10	13.28	.....	14.15	12.00
3917	3.16	.....	2.73	.....	1.37	11.71	.....	13.08	.....	27.08	.....
3975	2.54	2½	2.86	2½	2.80	9.68	8	12.48	.....	23.78	19.60
3931	.....	.....	.....	.....	.82	14.59	14	15.41	.....	14.59	14.00
3972	2.40	1¾	.....	.....	8.20	8.97	8	17.17	12	22.88	14.85
3978	1.25	1	.....	.....	.77	11.78	12	12.55	13	18.35	18.00
4008	1.23	1	.....	.....	1.25	13.48	12	14.73	13	20.62	18.00
3899	3.82	3¾	4.85	3	.97	11.07	9	12.04	.....	30.17	25.05
3974	1.02	1	2.43	2	1.28	11.02	9	12 30	.....	19.48	15.80
4013	1.14	¾	2.25	2¼	1.45	9.81	8	11.26	.....	18.31	14.10
4014	1.02	1	2.37	2¼	1.52	10.76	8	12.28	.....	19.25	14.85
4011	1.82	2	4.58	4	2.06	9.29	10	11.35	.....	22.43	22.00
3887	1.88	1½	2.36	2	.81	9.71	9	10.52	10½	20.14	18.20
3891	2.56	2¼	3.19	3	1.53	8.39	8	9.92	.....	21.85	19.38
3889	2.30	2	5.05	5	.74	12.36	8	13.10	10	27.24	21.80
4016	2.56	2	.....	.....	6.34	11.12	15	17.46	.....	24.82	24.00
3903	5.06	4	.....	.....	.....	.....	.....	23.09	20	30.07	.....

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3986	Susquehanna Fert. Co., Baltimore, Md.	Superior Rock Phos....	Mt. Airy.....
4015	" " "	XXV Phosphate.....	Graceham .....
3970	Talbott & Clark, Ellicott City.	Ammoniated Bone Phosphate.	Ellicott City.....
3971	" " "	Special Potato Manure..	Ellicott City.....
4031	H. S. Taveau, Baltimore, Md.	Allerton Guano.....	Baltimore .....
3898	" " "	Bone Compound.....	Baltimore.....
4005	" " "	Dis. S. C. Bone	Baltimore.....
3883	" " "	Potato Manure.....	Baltimore.....
4032	" " "	Special Compound No. 2	Baltimore.....
3897	" " "	Wheat & Grass Compound.	Baltimore.....
4028	R. B. Tenney, Georgetown, D. C.	Pure Ground Bone Dust	Gaithersburg .....
3991	1 P. Thomas & Sons Co., Philadelphia, Pa.	Fish Guano.....	Baltimore.....
3919	" " " "	Potato & Tomato Manure.	Baltimore.....
3930	" " " "	Tip Top Raw Bone Super Phosphate.	Baltimore.....
4012	Thomas & Edwards, Chicago, Ill.	Pure Fine Ground Bone.	Keedysville.....
3953	W. B. Tilghman Co., Salisbury, Md.	Fish Mixture.....	Hurlock .....
3599	" " " "	Fish Mixture.....	Salisbury.....
3600	" " " "	Mixture "B".....	Salisbury.....
3957	" " " "	Mixture "B".....	Salisbury.....
3935	Walter Todd, Baltimore, Md.	No. 1 Standard Bone Phosphate fr. Luck.	Baltimore.....
3958	E. S. Truitt, Salisbury, Md.	Fish Mixture.....	Salisbury.....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3986	.....	.....	.....		1.25	14.94	14	16.19	15	$14.94	$14 00
4015	1.32	1¼	1.31	1	1.67	9.58	8	11.25	10	17.79	15 55
3970	2.02	2	2.95	2	1.98	11.36	9	12.34	14	23.83	21 80
3971	2.73	3	5.44	5	1.55	10.77	9	12.32	10	28.56	25.10
4031	2.53	2½	2.97	2½	1.97	10.12	9	12.09	10	23.88	21 10
3898	1.20	1	2.51	2	1.46	8.60	9	10.06	.....	17.31	15 80
4005	.....	.....	.....	.....	1 10	14.09	13	15.19	14	14.09	13 00
3883	2.53	1½	8.98	1½	1.48	7.36	9	8.84	.....	26.28	16 80
4032	2.07	2	2.37	2	2.01	9.41	9	11.42	10	21.07	19 10
3897	....	.....	2.28	2½	1.11	11.81	11	12.92	12	14.54	13 90
4028	4.65	.....	.....	.....	.....	.....	.....	19.97	.....	21.27	.....
3991	2.72	1¾	2.61	2	2.88	9.84	9	12.72	10½	24.31	18 95
3919	2.69	2	6.72	6	2.42	8.23	9	10.65	10½	26.46	23 70
3930	4.06	3	3.58	2¾	2.36	9.32	10	11.68	13	28.36	25 55
4012	3.21	3	.....	.....	.....	.....	.....	26.14	22	32.08	.....
3953	3.86	3	1.70	1	2.16	6.99	6	9.15	.....	22.97	17 20
3599	4.59	3	1.24	1	2.90	6.98	6	9.88	.....	25.13	17.20
3600	4.28	3½	2.41	2	1.57	8.09	8	9.66	10	25.91	23.30
3957	4.22	3½	2.68	2	2 29	8.04	8	10.33	.....	26.36	22 40
3935	1.27	1½	2.51	2	1.40	10.82	10	12.22	12	20.14	19 10
3958	3.01	3	2.31	2	1.75	8.10	8	9.85	10	22.12	21.80

Table of Analysis and Valuation of Fertilizers Made at the

No	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3966	Tygert-Allen Fert. Co., Philadelphia, Pa.	H. G. Dis. S. C. Bone...	Millington.....
3956	" " " "	Six per Cent Guano.....	Pocomoke.....
3965	" " " "	Soluble Bone & Potash .	Millington..... ....
3955	" " " "	Standard Bone Phos....	Pocomoke.....
3954	" " " "	Star Pure Ground Bone.	Pocomoke .....
4026	Joshua Walker, Baltimore, Md.	Dis. S. C. Bone.....	Westminster.. .....
4025	" " "	Old Pittsburg Ammoniated Bone Super Phos	Westminster.....
4024	" " "	Victoria Bone.....	Westminster .....
3979	W. H. D. Warfield, Sykesville, Md.	Potato Compound.....	Sykesville.....
3952	S. L. Webster & Son, Cambridge, Md.	Acidulated Bone.....	Secretary .....
3951	" " " "	No. 2 Amoniated Bone Phosphate.	Cambridge .....
3949	" " " "	Our Special Six per Cent. Guano.	Cambridge.....
3948	" " " "	Poudrette Mixture.....	Cambridge.... ....
3950	" " " "	Time Bone Phosphate...	Cambridge.. .....
3960	Williams & Clark, New York.	Americus Brand Pure Bone Meal.	Ridgeley.....
3870	" " "	Americus Brand Bone Meal.	Ridgeley.....
3871	" " "	Dis S. C. Bone....	Ridgeley.....
3882	" " "	Good Grower Potato Phosphate	Baltimore.....
3873	" " "	Kainit.....	Ridgeley.....
3872	" " "	Muriate of Potash.....	Ridgeley.....
3869	" " "	Nitrate of Soda.....	Ridgeley.....

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No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3966	.....	.....	.....	.....	1.39	14.68	14	16.07	15	$14.68	$14.00
3956	6.23	6	6.01	5	.92	7.69	6	8.61	.....	34.48	30.20
3965	.....	.....	2.35	2	.61	10.51	10	11.12	.....	13.10	12.00
3955	2.15	2	2.73	2	1.71	8.59	8	10.30	.....	20.52	17.60
3954	4.46	4	....	.....	.....	.....	.....	21.15	22	28.24	.....
4026	.....	.....	.....	.....	1.01	15.65	14	16.66	15	15.65	14.00
4025	2.87	2.43	1.52	1½	3.33	8.19	8	11.52	10	21.97	19.59
4024	.....	.....	1.06	1½	2.27	12.01	12	14.28	13	13.98	13.90
3979	1.58	1½	2.13	4	.68	13.89	9	14.48	.....	23.84	19.30
3952	.....	.....	.....	.....	1.68	5.35	14.71	7.03	15.24	5.35	14.71
3951	2.08	2½	3.11	2½	3.41	5.60	7.48	9.01	9 53	18.12	20.20
3949	6.58	6	5.72	5	2.34	2.82	7	5.16	.....	30.24	31.40
3948	.61	.51	2.32	3.01	1.78	5.78	6½	7.66	7.68	12.16	13.01
3950	.56	½	1.60	2½	1.96	5.89	9	7.85	9.65	11.55	15.19
3960	4.56	3	.....	.....	.....	.....	.....	20.60	26	29.54	.....
3870	4.22	3	.....	.....	....	.....	.....	21.63	20	30.21	.....
3871	.....	.....	....	.....	1.27	14.06	14	15.33	.....	14.06	14.00
3882	1.66	1½	3.96	5	2.52	7.02	6	9.54	7	18.87	17.30
3873	.....	.....	12.80	13	.....	.....	.....	....	.....	12.80	12.00
3872	.....	.....	52.05	52	.....	.....	.....	.....	.....	.....	.....
3869	19.04	19	.....	.....	.....	.....	.....	.....	.....	45.70	45.60

Table of Analysis and Valuation of Fertilizers Made at the

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Place of Sampling.
3961	Williams and Clark, New York.	Special Formula No. 1..	Denton.....
3964	" " "	Special Formula No. 2..	Millington.....
3907	Robert A. Wooldridge, Baltimore, Md.	Bone & Potash Mixture.	Baltimore... .....
3942	" "	Little Giant Phosphate..	Baltimore.....
3900	" "	Triumph Pure Bone Phosphate.	Baltimore.....
3926	Zell Guano Co., Baltimore, Md.	Ammoniated Bone Phosphate	Baltimore..... ...
3914	" " "	Calvert Guano.....	Baltimore.....
3913	" " "	Dis. Bone Phosphate....	Baltimore.....
3985	" " "	Dis. Bone Phosphate & Potash	Mt. Airy.....
3912	" " "	Economizer.....	Baltimore .....
3915	" " "	Pure Dis. Animal Bone..	Baltimore.....
3890	" " "	Special Comp. for Potatoes. Vegetables etc.	Baltimore.....

Maryland Agricultural College, February to July, 1897, continued.

No.	NITROGEN Calculated as AMMONIA.		POTASH, K_2O.		PHOSPHORIC ACID.					Comparative Value per Ton Found.	Comparative Value per Ton Guaranteed.
					Insoluble Found.	Available.		Total.			
	Found.	Guaranteed.	Found.	Guaranteed.		Found.	Guaranteed.	Found.	Guaranteed.		
3961	1.68	2	3.36	3	3.05	10.17	8	13.22	.....	$22.43	$18.60
3964	1.33	1	3.26	3	2.15	7.29	7	9.44	.....	17.29	14.40
3907	.....	.....	2.55	2	1.20	11.84	11	13.04	12	14.87	13.40
3942	1.23	1	2.48	2	1.23	9.70	9	10.93	10	18.55	16.40
3900	1.65	1½	4.46	4	1.03	8.81	8	9.84	9	20.60	18.70
3926	2.39	2	2.62	2	2.62	9.66	8	12.28	10	22.95	18.80
3914	1.29	¾	2.18	1½	2.83	10.15	9	12.98	11	19.93	15.75
3913	.....	.....	.....	.....	1.92	15.08	14	17.00	16	10.08	14.00
3985	.....	.....	2.23	2	4.56	10.68	10	15.24	12	14.73	12.80
3912	1.38	1	1.75	1	2.41	10.69	9	13.10	11	20.16	16 00
3915	2.93	2	.....	.....	.55	15.42	14	16.07	16	27.62	24.00
3890	3.11	3	4.31	4	1.37	10.99	8	12.36	10	27.65	23.80

Bulletin No. 49, August, 1897.

Table Showing Mechanical Analysis of Ground Bone.

(The Chemical Analysis is Given in Preceding Table.)

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Fine Less than 1-50 inch.	Fine-Medium, 1-25 to 1-50 inch.	Medium, 1-25 to 1-12 inch.	Coarse. Larger than 1-12 inch.
3677	Baugh & Sons Co., Baltimore Md.	Bone Meal	40	35	25	0
3794	" " " "	Domestic Animal Bone Dust	60	20	14	6
3769	The Berg Co., Philadelphia, Pa.	Raw Bone	31	30	39	0
3723	Chemical Co., of Canton, Baltimore, Md.	Baker's Standard Ground Bone	60	20	20	0
3801	E. A. Clendennin & Bro., Colora. Md.	Pure Ground Bone	47	30	23	0
3791	Josiah Cope & Co., Lincoln University, Pa.	Pure Steamed Bone	60	18	16	6
3710	Ed. L. Coulson, Baltimore, Md	Pure Fine Ground Bone	40	20	20	20
3759	Detrick Fertilizer & Chemical Co., Baltimore, Md.	Pure Fine Ground Animal Bone.	32	28	40	0
3785	Eureka Fertilizer Co., Perryville, Md.	Pure Fine Raw Bone	37	23	28	12
3792	" " " " "	Bone Meal	70	20	10	0
3782	W. S. Farmer & Co., Baltimore Md.	Ground Bone	51	18	15	16
3819	Great Eastern Fertilizer Co. New York, N. Y.	Pure Ground Bone	64	13	18	5
3744	Griffith & Boyd, Baltimore, Md.	Pure Fine Ground Bone Meal	35	20	25	20
3644	Joshua Horner, Jr. & Co., Baltimore, Md.	Slaughter House Bone Dust	30	40	30	0
3805	Hanover Bone Fertilizer Co. Hanover, Pa.	Hanover Pure Bone Meal	30	34	36	0
3834	" " " "	Pure Bone Meal	32	36	32	0
3693	Hubbard & Co., Baltimore, Md.	Pure Raw Bone	66	29	5	0
3773	Lister Agricultural Chemical Works, Newark, N. J.	Pure Raw Bone Meal	44	26	30	0
3709	Maryland Grange Agency, Baltimore, Md.	Pure Bone Meal	55	25	20	0
3818	Nelson Morris & Co., Chicago Ill.	Big Two Pure Bone Meal	73	11	16	0
3945	North Western Fertilizer Co. Chicago, Ill.	H. S. B. Pure Ground Bone	58	25	17	0
3932	Piedmont—Mt. Airy Guano Co., Baltimore, Md.	No. 1 Raw Bone Meal	44	20	36	0
3990	Ramsburg Fertilizer Co., Frederick, Md.	Pure Bone Meal	72	21	7	0
3938	The Henry Reckord Mfg. Co. Belair, Md.	Raw Bone	24	28	30	18
3940	" " " " "	Fine Ground Bone	65	15	13	7
3886	Isaac Robinson, Baltimore, Md.	Pure Bone Meal	41	30	29	0
4027	" " " "	Pure Raw Bone	42	25	33	0
4019	Chas. Schaeffer, Westminster. Md.	Pure Raw Bone Meal	28	30	35	7
3998	Scott Fertilizer Co., Elkton, Md.	Pure Ground Bone	30	28	35	7

Table Showing Mechanical Analysis of Ground Bone.—Continued.

No.	Name and Address of Manufacturer.	Name of Fertilizer.	Fine, Less than 1-50 inch.	Fine Medium, 1-25 to 1-50 inch.	Medium, 1-12 to 1-25 inch.	Coarse, Larger than 1-12 inch.
3903	Susquehanna Fertilizer Co., Baltimore, Md.	Pure Ground Bone	35	30	27	8
4028	R. B. Tenny, Georgetown, Del.	Pure Ground Bone Dust	6	20	41	33
4012	Thompson & Edwards, Chicago, Ill.	Pure Fine Ground Bone	68	18	14	0
3954	Tygert-Allen Fertilizer Co., Philadelphia, Pa.	Star Pure Ground Bone	41	23	36	0
3960	Williams & Clark Fertilizer Co., New York, N. Y.	Americus Brand Pure Bone Meal	56	24	20	0

LIST OF FERTILIZERS LICENCED FOR SALE IN MARYLAND FOR THE YEAR ENDING FEBRUARY 1, 1898.

(Corrected to June 30, 1897.)

ALEXANDRIA FERTILIZER AND CHEMICAL COMPANY, ALEXANDRIA, VA.

Acid Phosphate.
Ammoniated Dis. Bone.
Dis. S. C. Rock.

A. ANDERSON & CO., MT. AIRY, MD.

Harvest Queen Guano.

E. B. ARNOLD, BALTIMORE, MD.

Butcher House Bone.

BALTIMORE SEED & IMPLEMENT CO., BALTIMORE, MD.

Ammoniated Soluble Bone Phosphate.
Special Potato Fertilizer.
Standard Bone Phosphate.

BAUGH & SONS CO., BALTIMORE, MD.

Animal Bone and Potash Compound.
Bone Meal.
Dis. Animal Bone.
Double Eagle Phosphate.
Domestic Animal Bone Dust.
Export Bone with Potash.
Fish Mixture.
General Crop Grower.
H. G. Tobacco & Truck Fertilizer.
H. G. Acid Phosphate.
Potato Fertilizer.
Pure Dis. Steamed Bones.
6 Per Cent. Peruvian Guano.
Soluble Alkaline Super-Phosphate.
Tomato Compound.
Wheat Fertilizer.

BECK, WALKER & BROWN, CHESTERTOWN, MD.

Corn Super-phosphate.
Propagator.
Tomato Super-phosphate.
Try Me Super-phosphate.
Trustworthy Super-phosphate.

THE BERG CO., PHILADELPHIA, PA.

Eclectic Pure Raw Bone Fine.

Eclectic Bone Manure.

C. W. BOHANAN & CO., BALTIMORE, MD.

Leader.

CHAS. E. BOND, SPENCERVILLE, MD.

Dis. Rock.
Pure Ground Bone.

JAS. BONDAY, Jr., BALTIMORE, MD.

Old Reilable German Kainit.

BRADLEY FERTILIZER CO., ROCHESTER, N. Y.

Bradley's Niagara Phosphate.

BRUMFIELD & FOSTER, COLORA, MD.

Acid Phosphate and Potash.
High Grade Acid Phosphate.
Ammoniated Bone Phosphate.

CHEMICAL CO., OF CANTON, BALTIMORE, MD.

Bakers' Standard Ground Bone.
Dis. Bone Phosphate.
Harrow Brand.
Potato Manure.
Pure Dis. S. C. Bone.
Red Clover.
Special Wheat and Grass Mixture.

R. L. CHRISTIE, COLORA, MD.

Christie's Special.
Farmers' Famous Bone Phosphate.
Soluble Bone and Potash.
Sure Crop Ammoniated Bone Phosphate.

CLARK'S COVE FERTILIZING CO., BALTIMORE MD.

Special Formula.

JOSIAH COPE & CO., LINCOLN UNIVERSITY, PA.

Ammoniated Bone Phosphate.
Pure Steamed Bone.
Try Me Bone.
Soluble Bone & Potash.

E. L. COULSON, BALTIMORE, MD.

Ground Bone.

J. A. CRANSTON CO., WILMINGTON, DEL.

Horse Shoe Soluble Bone.
Raw Bone Meal.
W. B. Raw Bone Super-phosphate.

CROCKERS FERTILIZER & CHEMICAL CO., BUFFALO, N. Y.

Erie Fertilizer.
New Rival Ammoniated Super-phosphate.
Niagara Phosphate.
Potato, Hop & Tobacco Phosphate.
Practical Ammoniated Super-phosphate.

DAVISON & CO., BALTIMORE, MD.

"Bos" Ammoniated Super-phosphate.
H. G. Ammoniated Super-phosphate.
"Pen Mar" Ammoniated Bone.
Special Mixture.

RUFUS K. DAY, BROWNINGVILLE, MD.

Day's Ammoniated Guano.

L. E. P. DENNIS & SON, CRISFIELD, MD.

Fish and Potash Mixture, No. 1.
Fish and Potash Mixture, No. 2.
Truck & Tomato Mixture.

DETRICK FERTILIZER & CHEMICAL CO., BALTIMORE, MD.

Ammoniated Bone Phosphate.
Corn Fertilizer.
Dis. Bones.
Dis. S. C. Bone.
Farmers' New Method Phosphate.
Farmers' Friend.
Gold Eagle.
Imperial Compound.
Potato Fertilizer.
Pure Fine Ground Animal Bone.
Royal Crop Grower.
Soluble Bone Phosphate & Potash.

Sea Fowl Guano.
Special Mixture.
Vegetator Ammoniated Super-phosphate.
Wheat Fertilizer.
Farmers' & Planters' Agency Ammoniated Bone.
Farmers' & Planters' Agency Orient Guano.

LOUIS F. DETRICK, BALTIMORE, MD.

Bone & Potash Mixture.
Kangaroo Komplete Kompound, K. K. K.
Orchilla Guano.
Silver Gray.
Sockless & Shoeless A. A. Phosphate.
XXtra Acid Phosphate.

JOSHUA W. DORSEY, ELLICOTT CITY, MD.

Dorsey's Ammoniated Phosphate.

DUDLEY & CARPENTER, BALTIMORE, MD.

California Tobacco Compound.
Dis. S. C. Rock.
Soluble Bone Phosphate.
Special Wheat Mixture.

EUREKA FERTILIZER CO., PERRYVILLE, MD.

Alkaline Bone & Potash.
Bone Meal.
Corn & Potato Special.
Farmers' Favorite Bone Phosphate.
Fish Rock & Potash.
Grain & Grass Mixture.
Ground Bone.
Imperial Bone Phosphate.
Potato and Vegetable.
P. & P. Super-phosphate.

W. EWING, LANDENBURG, PA.

Pure Ground Raw Bone.

D. ENGLAR, Jr., MEDFORD, MD.

No. 1 Bone Phosphate.
No. 3. Bone Phosphate.

ENGLAR & RINEHARDT, LINWOOD, MD.

No. 1 Ammoniated Bone Phosphate.
No. 2 Ammoniated Bone Phosphate.

EXCELSIOR GUANO CO., BALTIMORE, MD.

No. 1 Peruvian Guano and Soluble Phosphate.

FARMERS' FERTILIZER CO., WESTMINSTER, MD.

Acid Phosphate.
No. 1 Bone Phosphate.
No. 2 Bone Phosphate.
No. 3 Bone Phosphate.
XX Bone Phosphate.

FARMERS' AND PLANTERS' CO., SALISBURY, MD.

Fish Mixture.
Truckers' Mixture.

W. S. FARMER & CO., BALTIMORE, MD.

Co-operative Phosphate.
Clyde Brand.
Ground Bone.
Harvest Queen Phosphate.
Standard Phosphate.
Tobacco and Potato Fertilizer.

GORSUCH & SON, WESTMINSTER, MD.

Westminster Dis. Bone.
Westminster 3 XXXX.

G. W. GRAFFLIN & SON, BALTIMORE, MD.

Alkaline Phosphate.
Ammoniated Bone Phosphate.
Bone Compound.
Crop Grower.
Early Trucker.
Forsythe & Linthicum's Mixture.
Harford Bone.
Hunter's Ammoniated Bone Phosphate.
Hunter's Extra Ammoniated Bone Phosphate.
Pure Dis. S. C.
Pure Dis. Animal Bone.
Pure Ground Animal Bone.
Retriever Animal Bone Fertilizer.
Special Tobacco and Potato.

WM. R. GRIFFITH, BALTIMORE, MD.

Local Option (G) Super-phosphate.
Slaughter House (G) Phosphate.

GRIFFITH & BOYD, BALTIMORE, MD.

Ammoniated Bone Phosphate.
Ammoniated Soluble Bone.
Bone Meal.
Cereal Bone Plant Food.
High Grade Acid Phosphate.
Peerless Fertilizer.
Pure Dis. Bone.
Soft Ground Bone.
Spring Crop Grower.
Valley Fertilizer.

GRIFFITH, TURNER & CO., BALTIMORE, MD.

Ammoniated Alkaline Plant Food.
Ammoniated Butchers' Bone Phosphate.
Animal Bone Phosphate.
Dis. Bone.
High Grade Acid Phosphate.
Soft Ground Bone.
Soluble Bone Phosphate.

HANOVER BONE FERTILIZER CO., HANOVER, PA.

Blood and Bone Compound.
Dis. Animal Bone.
Dis. Bone Phosphate.
Excelsior Combine.
Farmers' Crop Winner.
Pure Bone Meal.
S. C. Rock.

HANWAY & KEEN, BEL AIR, MD.

Special Mixture.
Standard High Grade Guano.

S. M. HESS & BRO., PHILADELPHIA, PA.

Ammoniated Super-phosphate.
Emperor Phosphate.
Ground Bone.
Keystone Bone Phosphate.
Potato and Truck Manure.

JOSH. HORNER, Jr. & CO., BALTIMORE, MD.

Ammoniated Raw Bone Super-phosphate.
Cultivator.
Dis. Slaughter House Bone Dust.
Slaughter House Bone Dust.

HUBBARD & CO., BALTIMORE, MD.

Columbia Gem Phosphate.
Farmers' IXL.
H. G. Soluble S. C. Phosphate.
Oriental Phosphate.
Soluble Bone and Potash.
Standard Bone Super-phosphate.
Wheat Growers' Jewel.

T. R. HUBBARD & SON, CHESTERTOWN, MD.

Fruit Grower O. B. Guano.
Imperial Compound Fertilizer.
Our A. A. Bone Super-phosphate.
Our Peerless Fertilizer.
Victor Phosphate.

C. M. KEEDY, KEEDYSVILLE, MD.

Money Saving Phosphate.

LISTERS' AGR'L CHEMICAL WORKS, BALTIMORE, MD.

Celebrated Ground Bone.
Essex County Success.
Harvest Queen.
Pure Bone Meal.
Special Potato Fertilizer.
Standard Phosphate.

S. L. LAMBERD & CO., BALTIMORE, MD.

Boss Fertilizer.

T. H. LONGFELLOW, GREENSBORO, MD.

Farmers' Delight No. 1.
Farmers' Delight No. 2.

MAPES FORMULA & PERUVIAN GUANO CO., BALTIMORE, MD.

Complete Manure, A Brand.
Economical Potato Manure.

MARYLAND FERTILIZING & MANUFACTURING CO., BALTIMORE, MD.

Alkaline Bone.
Ammoniated Bone.
Bone Super-phosphate.
Dis. Animal Bone.
Dis. Phosphate.
Dis. S. C. Bone.
Fine Ground Animal Bone.
Globe Complete Manure.

Linden Super-phosphate.
O. K. Ammoniated Fertilizer.
Potato Food.
Sangton's Cereal and Plant Food.

MARYLAND GRANGE AGENCY, BALTIMORE, MD.

Agency's Favorite.
Corn and Potash Fertilizer.

F. MAYNARD, BALTIMORE, MD.

Truckers' Pride.
Maynard's Choice.

F. MEHRING, BRUCEVILLE, MD.

Acid Phosphate.
Dis. Raw Bone.
Emmerts' Half & Half.
$26.00 Phosphate.

MILLER FERTILIZER CO., BALTIMORE, MD.

Clinch Phosphate.
Dis. Raw Bone.
Dis. S. C. Rock.
Harvest Queen Phosphate.
Hustler Phosphate.
Potato Phosphate.
Standard Phosphate.
Special Potato.
Special Tomato.

GEO. R. MOWELL, GLENCOE, MD.

Dis. S. C. Rock.
Standard Bone Phosphate.

J. B. NICHOLS & SON, BALTIMORE, MD.

Farmers' Friend.

NICKERSON FERTILIZER CO., EASTON, MD.

Eastern Shore Domestic Guano.
H. G. Vegetable Compound.
Truck Guano.
S. C. Phosphate and Potash.
Special Mixture.

NORTH WESTERN FERTILIZER CO., CHICAGO, ILL.

Acme High Grade Fertilizer.
Ammoniated Dis. Bone.
Eureka Special Mixture.

Farmers' High Grade.
National Bone Dust.
Pure Ground Bone.
Prairie Phosphate.

G. OBER & SONS, BALTIMORE, MD.

Avondale Ammoniated Dis. Bone.
Ammoniated Wheat and Grass Grower.
Dis. Animal Bone.
Dis. Bone Phosphate.
Dis. Bone Phosphate and Potash.
Farmers' Mixture.
Farmers' Standard Ammoniated Phosphate.
Pure Bone Meal.
Robinson's Vegetable Fertilizer.
Soluble Ammoniated Super-phosphate of Lime.
Special Ammoniated Dis. Bone.
Special Compound for Tobacco.
Special Plant Food.
Special Tomato and Vegetable Fertilizer.

PATAPSCO GUANO CO., BALTIMORE, MD.

Baltimore Soluble Phosphate.
Coon Brand Guano.
Dis. Raw Bone.
Early Trucker.
Grain and Grass Producer.
Grange Mixture.
Patapsco Ammoniated Corn Fertilizer.
Patapsco Tobacco Fertilizer.
Pure Ground Bone.
Pure Dis. S. C. Bone.
Special Wheat Compound.
Tobacco and Potato Fertilizer.

PACIFIC GUANO CO., NEW YORK.

A No. 1 Phosphate.
Dis. Bone Phosphate of Lime.
Special Formula.

PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD.

Caroline Mixture for all Crops.
Insula Guano for Corn and Oats.
Mt. Airy S. C. Bone.
Mt. Airy Garden and Truck Fertilizer.
W. H. Moore's Special for Tobacco Beds.
Piedmont Potato Producer.
Piedmont Pure Raw Bone Mixture.

Piedmont Guano for Tobacco.
Piedmont Royal Ammoniated Bone and Potash.
Piedmont Dis. Bone Phosphate.
Special for Truck and Tomatoes.

R. H. POLLOCK, BALTIMORE, MD.

Accomac Trucker.
Ammoniated Bone Phosphate.
Dis. Animal Bone.
Dis. S. C. Bone.
Soft Ground Bone.
Special Wheat Grower.
Special Potato and Tobacco Fertilizer.
Superior Corn and Tomato Fertilizer.
Victor Bone Phosphate.

W. S. POWELL, BALTIMORE, MD.

Green Bag.
Red Bag.

THE RAMSBURG FERTILIZER CO., FREDERICK, MD.

Alkaline Phospho-Potassium.
Corn and Potato Fertilizer.
Dis. Animal Bone.
Dis. Bone Super-phosphate.
Excelsior Plant Food.
Old Va. Compound.
Pure Bone Meal.
Tobacco Compound.

THE RAISIN FERTILIZER CO., BALTIMORE, MD.

Ammoniated Alkaline Phosphate.
Ammoniated Super-Phosphate.
Bone and Potash.
B. I. Guano.
Dis. S. C. or Acid Phosphate.
Empire Guano.
Ground Bone.
Hope Guano.
Peach Tree Fertilizer.
Raisin's Dis. Bone..
Truck Guano.
Judge Robert's Special Mixture.
J. Walker's Dis. Bone Phosphate.
" " Old Pittsburg Phosphate.
" " Dis. S. C. Phosphate.
" " Economical Bone Phosphate.
" " Victoria Bone Phosphate.

ISAAC ROBINSON, BALTIMORE, MD.

High Grade Soluble Phosphate.
Potashed Bone.
Pure Raw Bone.
Special Potato and Tomato Phosphate.
Special Corn and Oats Phosphate.
Standard Dis. Bone.

ROBINSON, W. E., VALE, MD.

Robinson's Tomato Grower.

HENRY RECKORD MANUFACTURING CO., BEL AIR, MD.

Animal Bone Phosphate.
Dis. S. C. Bone.
Fine Ground Bone.
Special Compound.
Raw Bone.

JNO. S. REESE & CO., BALTIMORE, MD.

Ammoniated Bone Phosphate Mixture.
Dis. Phosphate.
Half and Half.

W. G. RINEHART, UNION BRIDGE MD.

No. 2.
No. 3.

CHAS. SCHAEFFER, WESTMINSTER, MD.

Big Gun.
Governor.
Leader.
Pure Raw Bone Meal.
Super A.
S. C. Bone.

SCOTT FERTILIZER CO., ELKTON, MD.

Potato Fertilizer No. 2.
Pure Dis. Bone.
Pure Ground Raw Bone.
Standard Phosphate.
Sure Growth Compound.
Sure Growth Super-phosphate.
Tip Top Soluble Bone.
Tip Top Soluble Bone and Potash.

D. A. SHARRETTS, WOODSBORO, MD.

Ammoniated Super-phosphate.
Bone Phosphate.

G. W. SHARRETTS, BALTIMORE, MD.

Ammoniated Bone.
Fish Rock and Potash.

SHARPLESS & CARPENTER, PHILADELPHIA, PA.

Dis. Bone Phosphate.
No. 1 Bone Phosphate.
Gilt Edge Potato Manure.

J. D. SIMMONS, HAGERSTOWN, MD.

Excelsior Wheat Producer.
Wheat and Clover Producer.

SLINGLUFF & CO., BALTIMORE, MD.

Alkaline Super-phosphate.
Ammoniated Super-phosphate.
Ammoniated Bone.
Baltimore Dis. Bone.
British Mixture.
Dis. S. C.
Ground Bone.
Half and Half.
McAffee's Potato Grower.
McAffee's Standard Ammoniated Bone.
Pure Raw Bone Dissolved.
S. C. Potato Grower.
Spinach Grower.
Special Bone Phosphate.
Tobacco Bed Fertilizer.
Top Dresser.
Truckers' Favorite.
Universal Guano.

W. H. STREET & CO., FALLSTON, MD

Ammoniated Dis. Bone.
Truckers' Guano.

GEO. W. STOCKSDALE, THURMONT, MD.

Ammoniated Super-phosphate.
Dis. Animal Bone Phosphate.

J. W. SULLIVAN, MONROVIA, MD.

Sullivan's Sure Success.

SUSQUEHANNA FERTILIZER CO., BALTIMORE, MD.

Ammoniated Bone Phosphate.
Dis. Bone.

Packing House Bone.
Potato Phosphate.
Pure Ground Bone.
Pure Bone.
Superior Rock Phosphate.
XXV Phosphate.

TALBOT & CLARK, ELLICOTT CITY, MD.

Ammoniated Bone Phosphate.
Potato Manure.

TAVEAU & CO., BALTIMORE, MD.

Allerton Guano.
Dis. S. C. Bone.
Special Compound.
Wheat and Grass Compound.

ROBT. B. TENNEY, GEORGETOWN, D. C.

Pure Ground Bone.

I. P. THOMAS, SON & CO., PHILADELPHIA, PA.

Fish Guano.
Imperial Super-phosphate.
Normal Bone Phosphate.
Potato Manure.
Potato and Tomato Manure.
S. C. Phosphate.
Tip Top Raw Bone Super-phosphate.

W. B. TILGHMAN & CO., SALISBURY, MD.

Bone Tankage Mixture.
Fish Mixture.
Mixture B.

E. S. TRUITT, SALISBURY, MD.

Fish Mixture XX.

TURNER & SON, BETTERTON, MD.

Special Tomato Compound.

TYGERT-ALLEN FERTILIZER CO., PHILADELPHIA, PA.

H. G. Dis. S. C. Bone.
6 Per Cent. Guano.
Soluble Bone and Potash.
Standard Bone Phosphate.

J. TYSON & SON, FREDERICK, MD.

Ammoniated Super-phosphate.
Half and Half Super-phosphate.

VIRGINIA-CAROLINA CHEMICAL CO., RICHMOND, VA.

Ammoniated Bone Phosphate.
Bone and Potash.
Special Compound.
13 Per Cent Acid Phosphate.
14 Per Cent Acid Phosphate.
15 Per Cent Acid Phosphate.

W. H. D. WARFIELD, SYKESVILLE, MD.

Potato Compound.

S. L. WEBSTER & SON, CAMBRIDGE, MD.

Poudrette Mixture.
Special No. 2.
Times Brand.
No. 2.

R. C. WELLS, BALTIMORE, MD.

XL Phosphate.

M. E. WHEELER & CO., RUTLAND, VT.

H. G. Corn Fertilizer.
H. G. Electrical Dis. Bone.
H. G. Grass and Oats.
H. G. Potato Manure.
H. G. Royal Wheat Grower.

WILLIAMS & CLARK, NEW YORK.

Acorn Acid Phosphate.
American Bone Meal.
Dis. Bone and Potash.
Good Grower Potato Phosphate.
Prolific Crop Producer.
Special Formula No. 1.
Special Formula No. 2.
Royal Bone Phosphate.

F. M. WILSON & CO., POCOMOKE, MD.

Favorite Truck Fertilizer.
Peninsula Ammoniated Super-phosphate.

WOOLDRIDGE & CO., BALTIMORE, MD.

Bone and Potash Mixture.
Buffalo.
Chieftain.
Double Quick.
Little Giant.
Triumph.
Special Potato Fertilizer.

THE ZELL GUANO CO., BALTIMORE, MD.

Ammoniated Bone Super-phosphate.
Calvert Guano.
Dis. Bone Phosphate.
Dis. Bone Phosphate and Potash.
Economizer.
Pure Ground Raw Bone.
Special Compound for Potatoes and Vegetables.
Truck Grower.

MARYLAND

Agricultural Experiment Station.

Tenth Annual Report.

COLLEGE PARK, MD.

1897.

MARYLAND

Agricultural Experiment Station.

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ROBERT H. MILLER .....*Director.*
HARRY J. PATTERSON, B. S....*Vice-Director and Chemist.*
JAMES S. ROBINSON.....*Horticulturist.*
MILTON WHITNEY.....*Physicist.*
WILLIS G. JOHNSON, A. M., *Entomologist.*
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CLARENCE W. DORSEY.....*Assistant Physicist.*
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ROSCOE C. PEACOCK.....*Stenographer.*

Located on the B. & O. R. R., 8 miles N. of Washington, D. C.

NOTICE.

The bulletins of the Station will be mailed free to any citizen of Maryland who sends his name and address to the Station for that purpose.

Correspondents will please notify the Director of change in their post-office address, or any failure to receive the bulletins.

ADDRESS,

MARYLAND AGRICULTURAL EXPERIMENT STATION,

COLLEGE PARK, MD.

COLLEGE PARK, PRINCE GEORGE'S COUNTY, MD.

June 30th, 1897.

To His Excellency, Lloyd Lowndes,

Governor of Maryland.

Dear Sir:—

In accordance with the provisions of Section No. 3, of Act of Congress, "To Establish Agricultural Experiment Stations, etc.," I beg leave to submit my report of the operations and financial statement of the Maryland Agricultural Experiment Station for the fiscal year ending June 30th, 1897, and to call your attention to certain pressing needs of the Station which should be fostered in order to develop the agricultural interests of the State, which are the foundation of all permanent prosperity.

Very respectfully,

ROBERT H. MILLER,

Director.

TENTH ANNUAL REPORT

—OF THE—

Maryland Agricultural Experiment Station

FOR THE YEAR 1897.

REPORT OF THE DIRECTOR.

The previous Annual Reports of this Station have covered two distinct periods; the one relating to the general operation of the Station covering the period of the calendar year, the other, relating to the finances, covering the period of the fiscal year, or from July 1st to June 30th. This arrangement having resulted in more or less confusion, we have determined, commencing with this number, to have the Annual Report cover the period included in the fiscal year. As the last Annual Report covered six months of the period from July 1st to June 30th, which, under the new arrangement, would be included in this report, it will, so far as the operations of the Station are concerned, cover only the six months from January 1st to June 30th.

It has been customary in previous reports to have the heads of the several departments of the Station report as to the condition and needs of their respective divisions, but these reports will be omitted in this, owing to the short period covered by it.

Station Staff.—The Station Staff has been subject to no changes during the past six months, except in the appointment of Mr. Roscoe C. Peacock, to succeed Mr. Charles Rider, as stenographer.

Publications.—Since January 1st the following Bulletins have been issued:

February, 1897, Bulletin No. 45, Composition of Commercial Fertilizers Sold in This State.

March, 1897, Bulletin, No. 46, Corn and Potato Experiments.

June, 1897, Bulletin No. 47, Dairy Farming.

June, 1897, Bulletin No. 48, Some Common Injurious Plant Lice, with Suggestions for their Destruction.

Weather Report.—The season thus far has been most favorable for the wheat crop, and fairly good for grass; but in the early part of May there came a succession of cold rains which greatly interfered with corn planting where it had not been done, and caused that which had been planted to come up badly and make a slow growth, as the weather continued cold after the rains had ceased. The usual weather table, giving temperature and precipitation for this and preceding years, will be omitted in this report because of its covering only six months.

Experimental Work.—The experimental work, which has principally engaged our attention for the past six months, has been largely a continuation of work mentioned in former reports. Of the field tests we consider none of greater importance than the experiments that are being conducted with lime; and certainly none elicit more interest from those who visit the Station.

Of the new work taken up in the past year may be mentioned: First, that under the general direction of the Chemical Department and now in progress, which is as follows:

1st. Experiments with nitrogenous fertilizers.

2d. Experiments with potash fertilizers.

These fertilizer experiments are being conducted on two new tiers of plots, which have been laid out in the same field in which the phosphoric acids plots are located, and the tiers are parallel with the phosphoric acid tiers. There are from 25 to 30 plots in each of the tiers. In general the work with the nitrogenous and potash fertilizers will be somewhat after the nature of the phosphoric acid test described in the Eighth Annual Report, but they will in addition take up other problems as to the time of application, mode of application and testing various means of rendering the plant foods available and in the best condition for the use of plants. In a general way, these tests are planned, and will be conducted with the aim of solving problems, the results of which will have a broad and general application rather than to be only useful and applicable to special and local conditions.

The Chemical Department has now under way some extensive digestion and feeding experiments with horses, and also some feeding experiments with pigs, which promises to furnish some interesting and useful results. The feeding tests in connection with the dairy are being continued, and some new phases taken up.

In the dairy there is now in progress a test of hand and light power separators.

The new work undertaken by the Department of Entomology includes the following:

First, a series of experiments were conducted the past spring with a view of ascertaining some method by which the strawberry weevil could be checked and controlled. Although the results thus far are negative, much valuable information has been gained, and the work will be continued another year. Operations of the same nature were also conducted against the rose bug.

Many new experiments have been made with new soaps and hydrocyanic gas against the San Jose scale, which has gained such a foothold in fourteen counties of this State.

Another line of work which this department has taken up has been the importation of certain insects from other places. The egg parasite of the Harlequin cabbage bug has been introduced from Louisiana.

Progress and Development of the Station.—While much work has been done during the past year, which, we hope may prove of benefit

to the farmers of the State, we realize that much more could have been accomplished had funds been available. Unlike most of the Stations in other States, the only sources of income which we have are from the Hatch Fund, as it is called, or the United States appropriation of $15,000 per annum, and from the sale of produce from the Experiment Station farm. These two sources of revenue are common to all of the State Stations, and in addition about one-half of them receive an annual appropriation from the States in which they are located, varying in amounts from about $1,000 to $80,000. The Stations having State aid in 1896 received in all $267,633, or an average of $12,744 apiece. Besides the Stations which receive this direct appropriation from their States, there are many others which receive fees of one form or another.

Because of Maryland's great diversity of soil and climate, her agricultural interests cover a wide range of subjects; and, consequently, it follows that her Experiment Station must cover a wider field of investigation than those in States where these conditions do not obtain.

The following are some of the interests which should have attention by the Station, which, under existing conditions, there are no funds available for:

1st. In order to further the horticultural and entomological work, they should be supplemented by work in Vegetable Pathology.

2nd. Funds should be available to make exhibitions of the products of the Station at the county fairs, to afford an opportunity to present the results of Station work and bring it before the people in a way that bulletins will not.

3rd. Tobacco investigations should be conducted on an extended scale.

4th. Artificial refrigeration in connection with the creamery is a subject of much importance to the dairy industry, and needs some study.

5th. Quarters and better facilities for cattle, sheep and pig feeding experiments should be had.

6th. Greenhouses for experimental work are a pressing need.

7th. An insectiary in connection with the Department of Entomology for research work would facilitate and enlarge the scope of the work of this division.

The above are some of the more pressing needs of the Station which should have attention, in order to enable us to widen the field of our investigations and acquire the necessary information for answering the varied questions which the different farming interests are asking us, and to also aid us in developing the agricultural resources of the State.

FINANCIAL REPORT, 1896-1897.

Joseph R. Owens, Treasurer, in account with the Md. Ag'l Expt. Station.

1896.	Sources of Revenue.	Dr.
July 1,	To unexpended balance	$ 87.72
1897.		
June 30,	To receipts from the Treasurer of the United States in four payments, per appropriation for the year ending June 30, 1897, under act of Congress, approved March 2, 1887	14,993.47
June 30,	To sale of dairy products	1,014.95
" 30,	To sale of farm products	179.09
		$16,275.23

1897.	Nature of Expenditures.	Cr.
June 30,	By salaries	$ 8,267.26
" 30,	" labor	2,559.39
" 30,	" publications	992.15
" 30,	" postage and stationery	182.72
" 30,	" freight and express	136.96
" 30,	" heat, light and water	495.80
" 30,	" chemical supplies	77.15
" 30,	" seeds, plants and sundry supplies	314.60
" 30,	" fertilizers	132.52
" 30,	" feeding stuffs	957.30
" 30,	" library	20.59
" 30,	" tools, implements and machinery	295.27
" 30,	" furniture and fixtures	50.72
" 30,	" scientific apparatus	43.42
" 30,	" live stock	719.00
" 30,	" traveling expenses	81.80
" 30,	" contingent expenses	191.00
" 30,	" buildings and repairs	327.02
" 30,	" unexpended balance	430.56
		$16,275.23

We, the undersigned, duly appointed auditors for the corporation, have examined the books and accounts of the Maryland Agricultural Experiment Station for the year ended June 30, 1897, that we have found the same well kept and classified as above, and that the receipts for the year are shown to have been $16,275.23, and the corresponding disbursements to have been $15,844.67. Vouchers for the disbursement of this sum are on file, and have been examined by us, and are found correct; thus leaving an unexpended balance of $430.56, the same to be accounted for by the Treasurer in the year beginning July 1, 1897.

(Signed)

Thomas J. Shryock, } *Auditing Committee*
Murray Vandiver, } *Board of Trustees.*